NATURAL HISTORY

OF

WATERS AND EARTHS,

O F

STONES, FOSSILS,

AND

MINERALS

INCLUDING THE

OBSERVATIONS OF LINNEUS

TTH THEIR

PROPERTIES AND USES IN MEDICINE.

By R. BROOKES, M.D.
Author of the General Practice of Physic, &c.

VOLUME V.

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MATURAL HISTORY

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CONTENTS.

Chap. Where Dans or Line W. John Laffe to	Page
	12
II. Of Mineral Waters peculiar to England,	V 14
HI. Of Barthe and Clays, warrite small O.	50
IV. Of Marls, Street, Street, Street, Street, St.	Z 54
V. Of Loams or Earths found in Strata or Beds,	
VI. Of Okers,	62
VII. Of Boles,	67
VIII. Of Tripolies,	71
1X. Of Ifing-Glass, Moscovy-Glass, and Tale,	72
X. Of Fossil Substances that are not elastick, and composed of short Fibres.	79
XI. Of Fossils, called Asbestos and Amianthus,	82
XII. Of the Fossils called Gypsums,	84
XIII. Of the Selenites,	- 86
XIV. Of Crystal,	91
XV. Of imperfect Crystals,	94
XVI. Of Spars, of various Figures and Shapes,	100
XVII. Of Crustated Spars debased with Earth,	104
XVIII. Of Salts,	107
MIX. Of Sulpburs, Bisumens, and Coals,	114
XX. Of Met Als- and Semi-Metals,	123
XXI. Of Gems of all kinds,	144
XXII. Of the more ignoble Stones,	171

CONTENTS.

XXIII. Of Sand-Stones, Rock-Stones, Marble and	
Alabafter, MOO	176
XXIV. Of Slates,	186
XXV. Of Marbles,	187
XXVI. Of Alabaster, Porpbyry and Granite,	197
XXVII. Of Common Circumscribed Stones,	200
XXVIII. Of the barder Common Stones,	216
XXIX. Of Stones approaching to the Nature of Flin	220
XXX. Of Flinty Stones,	224
XXXI. Of Stones that outwardly appear lik	
Pebbles,	226
XXXII. Of Common Pebble-Stones,	231
XXXIII. Of Sands and Grits,	246
XXXIV. Of Marchafites and Pyrites, or Fire Stone.	C 12 (25 (25 (25 (25 (25 (25 (25 (25 (25 (2
XXXV. Of Foffil Petrified Bodies,	280
	1
of Forth and the last said shoulders of the	12
OF WELL WINDS CONTRACT TO THE STATE OF	1 1

eo.

-01

TOI

411

123

MIL DE de Selector,

XV. Of interfere Cornells

AVI O Other or mine I

XXII. Of Conford Spire a high said Lath

Serve Co. B. Juliers, Bitumekin, and Cooles

IOX. Of Melost and East Pitale,

XXIII. The same graph there

MIN TO Compact all design

SWILLOUGH CHICAL

NUTHE OF SAPE,

Concha, bolone

Conchiton, deto-farrowed, _ * 201

The Figures in the first Column refer to the Pages in which the Accounts of the Fossils, &c. are given; and the Figures in the fecond Column direct to the Pages which the Engravings front.

A.

Ammon's Horns, Anthropocardites, Apricot Stone, Aftroites,	 	299 -	- 210, 250 - 270 - 298 - 170, 30	Fungin
291-190	В.		.bouring	Gref.
Barble Stone,	•	292 -		
Belemnites, Briony-Root Stone,	•	298 -	- 103 - 298	
Brontie,	20.00	170 -	- 103, 170	
Buccardities, -		299 -	- 210, 23	0, 200 b
Bufonites,	•		- 260	
Button Stone,	-	303 -	- 288	

Cap Sto	ine,	=	•	303 -	307
Cockle,	ftreaked,	****	Wiskers Television	BERTHER THE STATE OF	SEED NEEDE DE LE
Cockle	Stone,			293 — 293 —	180

TABLE TO THE PLATES.

Conchites,	293 — 101, 240, 280
Conchites, deep-furrowed, Concha, oblong, Crystal,	293 — 190 293 — 293 91 — 91, 148
T. E. S.	P-, E A
Diamonds,	144 — 91, 144, 146
Diorchites, et 1907 dente Control de la cont	The F 998 of the Accountage
R	
Foot Stone,	303 -/270 Comma. 298 - 298 Comma. Thous south
Grass, petrified.	201 — 190
Hippocrates Sleeve, Horie-head Stone,	303 — 288 299 — 210
Kidney Stone, -	301 — 270
Mamillaris	301 — 230

TABLE TO THE PLATES

Mulberry Stone, - T Mufcle Stone, - Top 882 cds. ags — gap ags — gap O.	802 — 202 250 — 202 Trichites,
Olfactory Nerve Stone, Olive Stone, Ophiomorphites, Otites, Owl's-head Stone, Oyster Stone, P.	301 — 260 299 — 200, 220 297 — 200, 280 301 — 260 300 — 103 292 — 240
Pear Stone, Pectunculus, Petrifaction of a human Bone, Porcupine Stone, R.	294 - 190, 280
Ruby, S.	148 — 91, 146
Scallop, Scrotum Humanum, Sea Hedgehog, Sea Urchin, Selenites, Snail Stone, Spar, crustated, Stalactites, Stalactites, Stalactites, Star Stone, Strombites,	294 — 190 301 — 270 296 — 250 295 — 250 299 — 288, 307 299 — 240 101 — 101 289 — 101 101 — 103 305 — 307 292 — 103, 230
Wind travers of the land	top tests only of the same of

TABLE TO THE PLATES.

602 - 802 002 - 802	Walter Steer, 1
Control of the Contro	- 303 — 230, 260, 288 303 — 230
•000 - 1000 •000 - 1000 Whethone,	W. comple syrolf großello Strong Strong - 303 — 288 10moining
Worm Stenes, occ	Over Stone,
for our car — sag	.4
302 — 270	Fear Stone, Pedimentor, Petrifaction of a ingman Bone, Porcuping Stone,
1 34 to - 84 .	я
	2
206 - 902 207 - 105 205 - 105	Scallen
101 - 101 105 - 002 107 - 002 108 - 002 108 - 002	INTRODUCTION.
201 — 082 201 — 101 202 — 302	Statemins, or icide Span, State State, Comments of the State, Commen
D62 (10) 535	- Bliombites

INTRODUCTION.

HOTTOUGOSTAL

TAVING accompanied the Natural Historian through the preceding volumes of this work, and affilted him in his enquiries into the nature and properties of quadrupedes—having purfued the suinged chorifters in their swift passage through the aircalled forth the Jealy tribe from their watry element, and viewed with a microscopic eye the minutest infetts -we shall now lead him into the very bosom of the earth, and there explain to him those wonders, which Nature has for ever hid from the knowledge of the indolent and careless. Though the great Author of the universe has been pleased to cast a veil over many things, yet we are not to imagine, that he has for that reason forbid our enquiries into them. That veil is not always impenetrable : from whence we may infer, that there is implanted in our nature a thirst after knowledge; and, as we are furrounded with objects of admiration, though we are perfect firangers to their first principles and most secret causes, our gratitude is always encreased, and our ideas enlarged, in proportion to the discovery we make of the structure, contrivance, and grandeur.

It is to the Earth we are indebted for the conveyance of those particles of Water, which in particular places, by collecting themselves together, form springs and sountains. Let us pursue one of these springs, insignificant as it first appears, through its gradual progression and encrease. It is at first nothing more than a vein of water, issuing from some hill upon a bed of sand or clay. The little stones that are dispersed around it are not sufficient to interrupt its current turns and winds, and murmurs as it rolls along. At last it clears its way, falls in a torrent down upon the plains, and swells by being united with some other streams. It hollows the ground by the rapidity of its fall, and throws up the earth on each side of it; it insensibly forces its way through every thing that ob-

ftructs its passage, and digs a bed or channel for itself. The overflowings of the adjacent ponds, the fnow that melts and trickles down the hills, and the additional Supplies of brooks and rills that fall into it, fortify and enrich it. Then it affumes a name, and fleers its course along the fides of flowery meads, it takes a tour round the hills, and graces, as it turns and winds, the spacious plains. It becomes the general rendezvous of almost all kinds of living creatures: a thousand little party-coloured birds, of various notes, divert themfelves upon its fandy banks, skim over its surface, and dip their wings in its refreshing streams. This is their favourite place all day, and, when the approach of night compels them to withdraw, they quit it with reluctance. Then the wild beafts enjoy it in their turn; but, at break of day, they leave the plains to man, and the free use of the river to the cattle. The numerous herds forfake their pastures twice a day to pay their usual visits to the streams, in which they quench their thirst, or feek some cool retreat. The river, in short, is as delightful to us as it is to them: for the most part, we reject the hills and woods, and fix our habitations on its banks. When it has enriched the fisherman with a profusion of its stores, and refreshed the farmer's thirsty plains; when it has adorned the pompous feats of the nobility, with the most delightful prospects, and made the country every where agreeable, it pays a visit to those large towns that are indebted to its friendly freams for all their wealth and commerce. It is probable, that the mighty waters of the Danube and the Volga of Europe, the Nile and the Niger of Africa, the Ganges and the Euphrates of Afia, and the Amazons river and Rio de la Plata of America, ewe their first source to some such trifling springs.

As we have confined ourselves, in the first and second chapters of this volume, to mineral and medicated waters, it may not here be improper to inform the younger part of our readers, in what manner springs receive their supplies. Hills and mountains contribute not a little to that purpose: At the bottoms of such mountains, whose tops are for ever covered with snow, (and of this kind are the Alps and the Pyrenees)

we find springs, for the most part, which begin to flow in May, but run no longer than September, the cause whereof may be easily accounted for. As soon as the fun has advanced fo near to one of the tropics. as to be able by its genial rays to warm the tops of the mountains, the fnow which covers them disfolves. infinuates itself through the pores of the earth, and finks either absolutely down to the bottom of those hills, or at least into their bowels, where its progress being obstructed by beds of clay or stone, it gathers together in a body, and there forms a variety of fountains; but no fooner does the fun deny its benign influence, than the fountains cease to flow. However, as there are many fprings, which are never dry, and which are far distant from any hills or mountains, let us enquire from whence these receive their inexhaustible sapply of water: This is undoubtedly from the rains that fall, which infinuate themselves into the bowels of the earth. It is an universal complaint. that moles, worms, field-mice, and a thousand other vermicelli, or little infects, are very pernicious to the earth in hot feafons, by their grubbing it up, and digging an infinite number of little holes in it of various depths; but the injury they do that way is amply recompensed by those numberless inlets, which they open for the rain, at fuch times when we stand most in need of it: and those crevices or chasms, which gape, as it were, on the furface of the earth in times of excessive droughts, render the passage of the water to the inferior layers more easy and expeditious. Those particles of water, which thus fall in showers, infinuate themselves with ease through beds of sand and porous earth, till they are obstructed in their passage by more compact beds of clay or stone, on which they rest, and there form one large bason or reservoir. The earth is almost every where full of those veins of fand, through which the water is perpetually passing; and some of those veins, having undoubtedly a communication with particular rivers, may either empty their own superfluities therein, or receive a supply in dry seafons. It is probable, that many of those springs, which do not vary in their height with the feafons, B 2

may receive their supply from some such source. That fpring water thould be warmest in the severest weather, feems eafily to be accounted for: it is well known, shat the earth abounds with particles of a fulphureous nature, which in warm weather escape through its pores, and exhale in vapours; but this is prevented, when the ground is frozen fo hard, as to form one folid, impenetrable mais. The fire, thus confined deep in its bosom, will consequently act with more force on every thing it meets with, and will naturally give a greater degree of heat to the water that paffes through it, all was a first the second of th

Hence we may conclude, that those things, which we often look upon with indifference, nay fometimes confider as prejudicial, are frequently of the greatest confequence and importance to us; the fea, though the faline particles it contains makes its waters very naufeous, is in reality the first spring which serves to quench our thirst; the wind, though we are very apt to complain of it, brings us our vapours from the fea; the lofty fummits of the mountains, though confidered by many as useless, help to settle and condense them a the holes, chaims, and crannies, which render the earth fo hideous and deformed, ferve as fo many conduits to convey the waters to their proper flations; and the beds or layers, though funk fo much beneath our fight, are formed to retain them,

Let us now turn our attention from the watry element, and take a flight view of the different foils and moulds, which the Earth produces. In these we see ample provision made for the various plants and vegetables they nourish and support. Some trees, plants, and grains, dwindle and die in fome foils, but thrive and flourish in others. If some delight in a warm. fome in a cold foil, others do best in that which is lax, fandy, or clayish; some in a moist, others in dry places; still we find provision enough for all these purpofes. Every country abounds with its proper trees and plants, and every vegetable flourishes and is gay somewhere or other about the globe. To this convenience, which the various foils of the earth are of to vegetables, we may add their great use and benefit

to innumerable animals, to many kinds of quadrupedes, fowls, infects, and reptiles, who make in the earth their places of repose and rest, their retreat in winter, their fecurity from their enemies, and their nefts wherein to repose their young; some delighting in a lax and pervious mould, admitting them an easy passage, while others seek a more firm and folid earth, that will better secure them from injuries without. In one place we are provided with chalks, okers, and boles, of all forts, for medicinal uses, and of all colours, proper for drawing the outlines or sketches of any defigns we propose to accomplish, or for painting fuch objects as may contribute either to our profit or delight. In another, we have various kinds of marl, which is so justly admired by our masons for its incomparable chalk, and more particularly by our farmers, who look upon it as an inestimable treasure. In several parts of England, but particularly in the barren regions of the north, there are beds or firsts of bituminous earth to be met with, commonly called either Sea or Scorch Coal. Thus Nature provides fuel for the inhabitants of those countries, whose climate requires a more powerful warmth than what is afforded them from the benign rays of the fun, and thus makes amends for the want of those bleffings, which are bestowed on more fouthern countries. Exposed to the feverity of the cold northern blafts, they stand more in need of what they dig out of the bowels of the earth, than of what we find on its furface. There, frangers to the delicacies of life, they are contented with bumble necessaries.

Mankind, in order to live with decency and pleasure, must be supplied with a vast variety of accommodations: for this purpose they are surnished with an infinite number of Fossils, which are intended by Providence as a treasure that should never be exhausted. These are carefully lodged in spacious repositories under our feet, where we may infallibly find them upon all emergencies. These useful materials do not lie buried in the centre of the earth, nor so deep in the bowels of it, as to be inaccessible; but are planted at a convenient distance from its surface, that the soil

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may produce its proper fruits, in due feason, without interruption. By this wife direction of Nature, our habitations are richly furnished both within and without, and the same spot of ground produces for our

fervice a kind of double harvests and a manufacture afford

From these considerations on fossils, let us turn our attention to those immense beds of Stone, which lie buried in the earth. Had all those vast masses, which lie under ground, been lodged up and down on its furface, we should have been much embarrassed, and had but little room left for the erection of our houses; had they proved as hard in the quarry, as they grow afterwards, all the art of man could never have been able to dig or cut them; and had they continued in their original state of foftness, when exposed to the open air, our houses would have never been secure. When the descendants of Noah were reduced to the necessity of dispersing into distant countries, in order to seek out commodious fettlements for themselves and their families, they found every place over-run with woods, and inhabited by an infinite number of favage beafts. By the help of a few boughs, and the skins of such beafts as they killed in the chase, they erected at first a few huts or tents, which served to shelter them from the injuries of the weather. As they were not however, at that time, always fafe and secure from the attacks of those devouring beafts, nor from the merciles infults of their more favage fellow-creatures, what a peculiar providence was it for them, who as yet lived in a reftless uneasy state, to find under their feet, and at a moderate distance from the surface of the earth. fuch immense quantities of matter, that was fost enough to be cut and fashioned according to their pleasure, and yet so solid at the same time, when exposed to the open air, and disposed in a proper manner, as to fecure them not only from the most outrageous storms, but from the infults of their private enemies; and, at last, to defend whole kingdoms from any hostile invafions! By this means, in process of time, both villages and cities arose out of the earth, and men attained to the art of lodging and cementing the most unwieldy stones in the closest manner; of building for themselves 45 20 commodioss

commodious habitations, impregnable fortreffes, and magnificent palaces for the reception of their princes and rulers; and, in fine, those solemn and pompous temples, in which all the families then on earth met together at stated times, to pay their tribute of gratitude and worship to their common Parent, to visit one another without pride or respect of persons, and to lay themselves under the most solemn engagements, inviolably to perform all those good offices one towards another, on which the welfare of an amicable fociety entirely depends. We shall not here enter into any enquiries, how these immense stones are formed, fince that matter is fully explained in the last chapter of this volume; we shall only add, that besides these huge masses, which the earth provides us for building our habitations, there are others, though less in bulk, of infinitely more value, fuch as diamonds, rubies, carbuncles, and a thousand other precious gems, which adorn the infides of the most fumptuous palaces, and

grace-the diadems of fovereigns.

We come now to the last point of consideration, that of Metals, of which gold is undoubtedly the first that claims our attention. The preference, which we give to this above all other metals, is by no means the effect of prepoffession or caprice: the superior regard. we pay to it is grounded on its intrinsic and inherent merit. There is no metal so solid and compact, so weighty, or so capable of being refined to so great a degree of perfection: it is, beyond all contradiction, of the most beautiful colour, and comes nearest to the radiancy of fire: it is the most ductile and obedient to the workman's hands of all metals whatever, and never foils or befmears them, as others will. The least particle of it gives an additional grace to every thing it touches, and has one other excellent quality. which is that of its never rufting, nor will it lofe any thing of its weight while refining in the fire. It is therefore not at all furprifing, that mankind should unanimously agree to fix upon a metal of so pure, so folid, and durable a nature, in order to pay for and procure such various accommodations as they indifpenfibly wanted. Before the discovery of this precious BA

ore, trade and commerce were carried on by way of barter: wine, for inftance, was exchanged for oil, corn for flax, and one commodity was mutually agreed to be accepted for another, as occasion required. This method, however, of negociating bufinels, was artended with a thouland inconveniencies: two contiguous nations or provinces might possibly be overcharged with the fame commodity; or, supposing the products of their grounds to be different, yet it created abundance of trouble to make a just computation of their real and intrinsic worth, infomuch that it was no easy matter to adjust an equivalent in the wholesale trade, though practicable in the retail way; and men were often obliged, with reluctance, to diffense with many things, for want of fuch accommodations, as were agreeable to those who were possessed of them. Now, gold being a metal of a pure, ductile, and incorruptible nature, was confidered by them as the most agreeable and proper fubitance, of which to make a general standard, and the most commodious equivalent that could possibly be given in exchange for all the accommodations and conveniences of life whatever. As this radiant ore was very fcarce, they agreed, with one voice, that a small quantity of it should be deemed a fufficient compensation for a large portion of any other merchandize. They wifely confidered, how great would be their advantages, to be enabled, by virtue of a small portion of such precious metal, (which is little or no incumbrance to a traveller, and which he can easily conceal from the eyes of those, who might otherwise be disposed to oppress him) to take a tour all round the habitable world, in order to furnish them with whatever conveniencies they might want, and to defray all their necessary expences, without the least dependency, incumbrance, or enquiry. This method of transacting business was found to be so expeditious and convenient, that, in process of time, the practice became univerfal. There was one little inconvenience, indeed, that at first attended it : every merchant was obliged to carry his scales and weights in his pocket, in order to know the intrinsic value of the gold he seceived; but an expedient was foon found out to fave 2550

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him the trouble, by making little thin pieces of gold, which afterwards introduced those of silver, with some known and public figure impressed thereon by the authority of government, to settle and determine their real value, that he, who delivered his goods, might be well assured, that he received so much gold or silver, of such a weight and standard, in return. As gold, however, was reserved, on account of the great scarcity of it, to discharge and pay off darge sums, with the utmost expedition, they had recourse to baser and more common metals for their daily disbursements and their retail business.

The obedience of this metal, under the hands of the gold-beater and wire-drawer, is not only furprizing, but a perfect prodigy; and, if we were not eye-witnesses of it, we should never be prevailed on to think it practicable. By the art of the gold beater, a piece of this metal, of only an inch fquare, and not thicker than paper, is hammered out into a thousand leaves, leach of four inches square. The following operation, though equally common, is much more furprizing. A gold wire-drawer takes an ingot or bar of filver, of a cylindrical form, two feet and eight inches in length, and two inches and nine twelfths of an inch in circumference. Upon this he spreads as many leaves of beaten gold as weigh, in the whole, exactly half an ounce. He then drives the extremity of this cylinder with force through a round hole that is made in a fleel plate, the entrance whereof is wider than the other end, which is called the eye. After this the ingot is passed through several holes successively that are one finer than another. Thus, by flow degrees, it is reduced to the thinnels of a reed, a coarle thread, and at laft, after having passed through upwards of an hundred and forty holes, acquires the minuteness of the finest bair. The most surprizing part, however, of this operation is, that the half ounce of leaf gold, which first covered the ingot of filver, should, notwithstanding its former degree of fineness, grow gradually ftill finer and finer as it palles through the different wire holes, and cover the furface of the filver to very exactly, as that no part of it whatever B 5 fhould

should be seen; it appears, in short, one entire thread of gold. Thus half an ounce of gold may be made to extend itself into a surface of above seventy three leagues in length. Hence we may plainly perceive, that the internal nature of this metal, and, in all probability, that of all other substances whatsoever, is

beyond human comprehension.

The uses of copper and tin, for domestic purposes, are well known to every one; and there is not a metal that can be mentioned, but what has some useful property: yet that very metal, which to all outward appearance is the meanest and least polished, which abounds most with allay, is of a dark and gloomy hue, and the most liable to rust-yet that very metal, iron, is more beneficial and advantageous to us than all the reft. It has one particular quality, which alone is fufficient, in some measure, to give it the precedence to all others, and that is, it is more hard and tenacious, which renders it every way qualified for the most lasting purposes. By being thus able to refift the strongest efforts, it becomes the guardian, as it were, of our houses, and our most faithful trustee. By linking thus inseparably together the materials of which our habitations are composed, it secures our persons, not only from the injuries of the weather, but from the hands of merciless and violent men. To this metal we are indebted for the greatest part of our utenfils, which are made use of, not only in navigation, husbandry, and clock-work, but in all other liberal and mechanical arts. Gold and filver, had we not iron implements to work and fit them for our feveral purposes, would be in a great measure useless. We are so much indebted to this particular metal, that our daily provisions could not be commodiously dressed, nor should we well know how to divide them for eating, without it. To fum up its fuperior excellency in a few words: all other metals, indeed, are useful; but this is absolutely necessary, and we can make no tolerable thift without it.

From all these considerations we may conclude, that we can neither look round about us, move one step upon the earth, or dig under our feet, without meet-

ing with a profusion of those treasures, which Providence has provided either for our convenience or delight. The furvey of Nature, therefore, when rightly purfued, is a kind of popular theology, where all human kind, even the illiterate, may learn those truths, the knowledge whereof is a concern of the utmost importance. After this general survey, let us accompany the Natural Historian into the storehouses of Nature, and there open to his view their minutest contents. Ar we washe a matched

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NATURAL HISTORY

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MINERALS.



CHAP, I.

Of Medicated MINERAL WATERS.

MONG Medicated Mineral Waters fome are cold, and others hot; the former are called by physicians ACIDULÆ, that is, a little partaking of acid, because some of them have a subacid or vinous tafte, especially when taken immediately from the spring. The hot springs are supposed by some to be owing to subterranean fires; because near those places where there are vulcanoes they are most frequent; but others think they arise from the fermentation of the different particles of which they partake as they pass through different strata of the earth; as for instance, Iron and Sulphur. But, be this as it will, their virtues are not owing merely to the heat or cold, but to the principles of which they are composed; for which reason it will not be worth while to treat of them as fuch, but to take notice of their contents, to which their properties are owing. We shall therefore divide them only into four Classes : 1. Mineral Waters containing earthy Particles. 2. Waters impregnated with Salts. 3. Sulphureous Waters. And, 4. Waters impregnated with Metals. 1. There

r. There are mineral Waters, which have imbibed earthy particles that have the properties of Soap, particularly the Soapy Water of Planbiars in France, which at the spring head is warm, and tastes a little fat or soapy, with a small degree of roughness. This is supposed to run through a strata of Fuller's earth: it is prescribed in disorders of the stomach, proceeding from acidities, as well as in spitting of blood, excessive bleedings, a consumption of the lungs, and many other disorders, for which they are either drank or used as a bath. A large quantity is to be drank in a morning upon an empty stomach, and some make use of it for common drink.

2. Waters that have imbibed Rock Salt are not very uncommon, but they are not as fome imagine of the fame nature as those in which common Salt is dissolved; because this latter is not a simple substance, but contains a mixture of Rock Salt and fixed Alcalious Salt, imbibed in the bowels of the Barth; and that which is made with Sea Water partakes of a Volatile Urinous Salt, which is the produce of the putrefaction of fish, sea plants, and other marine substances, together with

Bitumen and various Minerals.

It is but lately that Sea Water has been thought of any internal use in medicine, or at least its properties have lain dormant for a great number of years, except for diseases of the skin, for which it has been ordered as a bath; it has been recommended in all diforders of that kind, from the itch to the leprofy, as well as pains in the limbs; and fome have thought, and still think, that it is a specific against the bite of a mad Dog. It is now prescribed inwardly in all obstructions of the glands, in whatever parts of the body, and the dife arifing therefrom, for which it is both drank and sed as a bath. It is also good against obstructions of the kidneys, when there is no inflammation, or the flone is not too large to pass; and likewise against recent obstructions of the liver, and consequently the yellow jaundice, when given with medicines proper for that disease. A person of twelve years of age may drink half a pint every morning, and an adult a pint. man the nation and with warning

The Waters of mineral springs, impregnated with Sal Gem, when given inwardly, open the body and promote urine; besides which they are drying, binding, and discutient, whence they are good in cachexies,

and the dropfy.

Those Waters are said to be nitrous, which abound with a Salt like the Natrum of the ancients, which some have mistaken for Saltpetre; whereas it is a kind of Alcalious Salt. Those springs that abound with it, are good for dissolving thick clammy humours, for opening obstructions of the bowels, as well as in a decayed appetite. When used as a bath, they help to resolve swellings and obstructions of the nerves.

3. There are many mineral Waters that partake of Sulphur, which may be easily known by the smell, as also by the sediment that is left after it has been evaporated over the fire. These are commen 'd in disorders of the breast, and soulnesses of the skin, whether drank, or used in a bath; as also in trembling of the limbs, contractions of the tendons, the rickets,

and fome kinds of palfies.

Our Bath Waters are thought chiefly to partake of Sulphur, mixed with an exalted Vitriolic Steel. They are good in all weaknesses and decays of the constitution, as well as for a debauched stomach. They likewise dissolve viscid and saline particles in the blood and humours, and sweeten the sluids in general. Hence they are good in dropsies and consumptions bestore they are too far gone; as also in catarrhs, cachexies, jaundice, scurvy, scorbutic rheumatisms, asthmas, and all diseases of the skin, as well as old pains and achs; nor are they less effectual in many womens disorders.

4. These in general partake of Iron or Steel, though there may be possibly some of other kinds which have not been taken notice of by naturalists. There are many of these in Hungary, Germany, France, and other parts of the world, but the Pyrmont and Spa Waters are the most famous we have from abroad; and in England we have the Tunbridge, Scarborough, Hampstead, and Islington. These in general dissolve gross humours, sweeten those that are salt and acid, and open obstruc-

tions

tions. They are accounted good in all diseases of the head, whether they arise from the consent with the stomach, or not; they are also good in many diseases of the breast, particularly shortness of breath, coughs, and spitting of blood. In short, they are efficacious against all those distempers wherein Iron or Steel is of any use; and they must be much better, because the particles of the metal are become so volatile that they do not change the colour of the water; but then they are apt to sly off after they have been exposed to the air for a few days. Besides, as it is necessary to drink a pretty large quantity of these waters, the solution of gross thick humours is much better performed hereby, than by administring the metal in any other form.



CHAP. D.

Of MINERAL WATERS peculiar to ENGLAND.

HAVING taken a general survey of medicated Mineral Waters in the preceding Chapter, we shall in this consine ourselves to those only, which are peculiar to England: We shall relate the chemical trials, which have been made to find out their virtues, and the good effects which they have been experienced.

to produce in the constitution.

It is usual to give an account of their contents, after the evaporation of the water; but this is not sufficient in all cases, because there is often a volatility, when just taken from the spring, wherein the principal strength of the water resides, and which is lost if not immediately drank. Hence it follows, that the nature of the contents will not always ascertain the virtues of the waters. However, in recounting the effects and properties of these waters, all the circumstances will be taken notice of, that may tend to give an insight into their operations; and that each spring may be more readily sound, I shall place the counties in which they arise in an alphabetical order.

BERKSHIRE. In this county we meet with but two Mineral waters, one at Sunning-bill in Windfor-Foreft, which is of the fame nature as the Tunbridge waters; and the other at Comner, or Cumner, three miles west of Ouford. This last water is always of a whitish colour, tespes cially in the fummer time when the well is low; the reason of which appearance is faid to be owing to its proceeds ing from lime-stone. Oil of Tartar being dropt therein, causes it to let fall a white sediment; and Spirit of Hartshorn turns it to a pearl-colour; but with the Solution of Silver it turns to a purplish pearlecolour, and with Syrup of Violets, green. A gallon of this water will yield 206 grains of fediment, whereof 76 grains are lime-stone, and the remainder a calcarious nitre. The sediment is dark brown, with a saltish and very bitter tafte; will ferment with Vinegar, as well as with Oil of Vitriol, and will turn green immediately with Syrup of Violets. The falt itself is of a yellowish brown, and has a faltish, nauseous, bitter taste. It is a kind of calcarious nitre, but inclines more to an alcall than most others of this class. A quart of it will purge a robust country fellow.

CORNWALL. The mineral fprings in this county have never been taken notice of till very lately, and that by Mr. Borlace, in his Survey of Cornwall. Maders Well is only a fpring of pure water, which rifes in the parish of Madern, four miles west of Penzance. However, it is reforted to by many people that are afflicted with pains, aches, and friffness of the limbs; and it has done many cures, which may be only owing to the coldness and purity of the spring. Eury Well, once fo famous, still preserves its reputation for drying up humours, and healing wounds and fores. However, as this has no evident mineral impregnation, these effects may be owing merely to the coldness of the water, which braces up the nerves and mufcles, and strengthens the glands. Here is another well of this fort, called the Holy Well, which is about a mile and a half to the north-west of St. Cubbert's church, in a cave that lies in a fmall fandy bay. In

they come to an elemented codes.

this cave, there are stones like iscles, that hang from the roof, and the stoor of the rock is covered with the same substance. This water will not change the colour of green tes, nor curdle milk; from whence it is concluded, that it has neither alum nor steel in its composition. When this water is evaporated, it will deposit a small sediment, of the same colour and substance with the incrustations: it will neither melt nor stame, nor has it any particular taste or smell, and yet is in great use for sluxes and disorders of the bowels.

The most remarkable Chalybeate Spring in Gornwall rifes in the tenement of Colurian, in the parish of Ludgvan. The bed through which this water runs is full of an ochreous, iron mineral, from which its tafte and smell proceeds. It turns to a deep reddille purple with Galls, and with Oak-leaves it becomes of a bluish black, but has a purplish cast. When a thimbleful of Oil of Tartar was dropped into this water, it fell immediately to the bottom of the glain, which held about half a pint: but it precipitated no fediment, nor made any change in the water; only the colour was more inclinable to that of a bright oker, but was fcarcely discornable. It will not turn filver black, and therefore it is concluded there is no fulphur in it; but in the morning, before the water is ftired. there is a film on the furface with all the colours of the rainbow, shooting to and fro, which occasions fome to think, there is a naptha in the water. It will mix with milk, and lathers readily with foap; and after it has flood 24 hours in the open air, it undergoes no alteration from Galls, which is owing to the flying off of the volatile spirit. The virtues of this water are very great; for persons have been cured of the King's Evil, by drinking it, and washing the parts affected, whom Mr. Borlace knew; and he heard of many others that were cured in the fame manner. It is very diuretick, promotes perspiration, opens obstructions of the bowels, and restores a lost appetite. It also cures fores of every kind, and is a very good eye-water.

CUMBERLAND. At Stanger in this county, two miles fouth of Cockermouth, and three west of Kestwick

there is a spring of clear saltish water, with the take and fmell of iron; it turns white with Spirit of Hartfhorn, and lets fall a great sediment with Oil of Tartar: a gallon of this water will yield 1170 grains of fediment, whereof 1080 are sea-falt, and the rest lime-stone. It is white, hot on the tongue, and grows very moist in a damp air. There is a little mixture of nitre with the sea-salt, but this last predominates, and is joined to a confiderable quantity of iron. Four or five pints will purge upwards and downwards; but it is an excellent remedy in furfeits, pains in the stomach and breast, the green-sickness,

scurvy, fores, and breaking out of the skin.

DERBYSHIRE. Buxton Well lies at the bottom of a dirty village of the same name, and there is a large commodious house, to which much good company refort in the summer time. The water is neither so hot as that of Bath, nor so cold as that of Bristol. It has a fweet, pleasant taste, and a gallon will yield about 20 grains of a fediment, which confifts chiefly of lime-flone, sea-falt, and a little calcarious nitre, It deposites a white sediment with Oil of Tartar; but it will not turn filver black, nor does it discover any figns of fulphur. It will not ferment with Spirit of Vitriol, nor turn green with Galls, till they have foaked four days therein. It is a temperate bath, and a very light water. It is of a relaxing, diluting, fweetening and attenuating nature, and will open obstructions of the smallest vessels. It is good in confumptions, for hot fcorbutick humours, and all fluxions and bleedings, as well as in hypocondriacal and hysterical cases. It is of great use in the regular gout, in rheumatic and scorbutick pains, in vomiting of blood, and in all kinds of fluxes. It is good in internal inflammations, confumptions, the diabetes, and a bloody urine; as also in a bilious cholick, want of appetite, and in cold stomachs from hard drinking. To these may be added, contractions, cramps, convulfions, St. Anthony's fire, and all breakings out of the fkin.

Matlock Bath is also in Derbysbire, near Warksworth, and ten miles north by well of Derby. The village is

feated

WATERS, EARTHS, FOSSILS, and MINERALS.

feated on the very edge of the river Derwent, is a very beautiful place, and is frequented by very polite company. The water of the bath is not fo hot as that of Briffol, and it curdles with foap. It deposites a white fediment with Oil of Tartar, and the same experiments give the same appearances as in Buxton water. A gallon of water yields 40 grains of fediment, whereof 13 are falt, confishing of nitre and fea-falt; and the remainder is a rough, white alcaline earth. The virtues of these waters are nearly the same as those of Buxton and Briffol, used either internally or externally. Both drinking and bathing are generally thought good for the cancer and the king's evil. Bathing is proper for rheumatisms, scurvy, and defedations of the skin. It is also used successfully in all forts of bleedings, as well as hectick fevers and inward ulcers, with a milk diet. It also cures the diabetes, and the bilious cholick.

Westwood is another village in this county, near Tandersley, where there is a spring, which seems to be a solution of the pyrites, that generally attends pitcoal. It turns blue with Galls, and the salt separated from the earthy part of the sediment will shoot into beautiful crystals of vitriol, without any other salt. The water will cure stubborn ulcers, and particularly healed one in a maid servant that was very frightful: it was washed twice a day with this water, and was

cured in three months.

Dorsetshire has only one mineral water hitherto taken notice of, and this is at Nottinton, a village near Weymouth. The water has a strong sulphureous smell, with a stavour resembling that of boiled eggs, and the colour in a tin vessel is blue. At the sountain head a shilling put into this water, becomes of a gold colour in two or three minutes; and from various experiments it appears to be impregnated with sulphur and natron. It is remarkable for curing soulnesses of the skin, by internal use.

DURHAM. Hartlepool is a market-town in this Bishoprick, 15 miles south-west of Durham. The water found here is a chalybeate, though as it rises it discovers a little steel and sulphur, which soon slies off after

after it is taken up. It lets fall a white fediment with Salt of Tartar, becomes whitish with Spirit of Hartshorn, and turns of a pink-colour with Galls; but green with Syrup of Violets. A gallon yields 120 grains of fediment, whereof two parts are nitre, one fea-falt, and the rest lime-stone. The water is an excellent antifeorbutick, and cures habitual cholicks. It is good in pains of the stomach, in indigestion, in the gravel, in women's obstructions, in hypocondriack melancholy, in the cachexy, in weaknesses of the

back, hectical hears, and recent ulcers.

Basex. Here are feveral mineral waters in this county, of which one is at Upminster, seven miles fouth of Burniwood, and eight east of Burking. The water is bitter, and will curdle with Oil of Tartar, but more strongly with Spirit of Hartshorn, and will not lather with Soap. A folution of Alum causes it to let fall a large grumous fediment, and the folution of Copperas changes it to a dark dun colour. It appears to be a fulphureous water, of a confiderable firength, and a gallon will yield 332 grains of fediment, which is of a nauseous bitter tafte. It is chiefly a calcarious nitre, mixed with a little nation and fea-falt. The water is purgative and dinretick, abforbs acidities. frengthens the flomach, and checks vomiting.

: Witham water, when fresh, is perfectly clear, and has a very firong chalybeate fmell and taffe. It has a remarkable freshness when just taken from the spring. which renders it agreeable to the take and flomach; but, after it has flood awhile, it lofes that quality, and deposits a brownish sediment. A gallon, by eyaporation, will yield 30 grains of fediment, which will grow damp in a moist air. However, this water is of no use, unless it be drank immediately at the foring, and then it is diuretick, and is good in hectick fevers, lowners of spirits, weakness of the nerves, and want of apporite. Witham is a market-town, which lies in

the road between Chelmsford and Colchester.

Tilbary is a village, feated over-against Gravefend in Kent; the water here is somewhat of a straw-colour. and has a fost smooth taste. With Oil of Tartar, it will cause no immediate precipitation, though it will curdle

curdle with Soap, but not with Milk. A gallon will yield 180 grains of fediment, of a yellowish brown colour, with a sharp taste, like that of a fixed alcali. A quart of this is a middling dose; it generally passes off by urine and perspiration. It warms the blood, is good in lowness of spirits, and is a specifick in loosenesses. It also cures almost all sluxes of blood, and is particularly good in an acidity of the stomach, and for some kinds of sources.

FLUNTSHIRE is in North Wales, and Caergile, in this county, is about feven or eight miles fouth by well of Chefter. The water found here is as clear as crystal, and yet it will turn whitish with Oil of Tartar; it also turns green with Syrup of Violets, and red with Logwood. A gallon will yield 220 grains of sediment, of which 66 are earth, and 154 are sea-falt and lime-stone. It appears to be impregnated with calcarious nitre and sea-falt, and, if drank to a quart or two, will purge pretty well. It has cured a woman that had a loathsome scurf all over her body, by drinking three pints of this water in a day. Likewise several children afflicted with scorbutick disorders, and the leprosy have been cured by drinking and washing.

GLOUCES DEASHIRE has but one remarkable water. which is at Cheltenban, a town which lies in the road from Glouceffer to Warwick. It was not much taken notice of before the year 1740, and then it was faid to be the best purging water in England; but it begins now to be neglected. It is limpid, a little brackish, and nauseoully bitter. It will curdle with Soap, and lets fall a white, grumous fediment with the folution of Salt of Tartar, and with the Spirit of Sal Ammoniac. It will ferment with Oil of Vitriol, Spirit of Salt, and Vinegar: beef and mutton boiled therein will become of a pale red, and it turns a deep green with Syrup of Violets. A gallon will yield 688 grains of fediment, which contains a little impalpable earth, mixed with a little falt, which is chiefly calcarious, and has a nauseous bitter taste. The dose is from one pint to three or four, nor is it ever attended with gripes, but creates a keen appetite. It has been used with success in the gravel, and will cure old fcorbutick humanes,

St

St. Anthony's fire, and ftrumous inflammations of the eyes, when here a heart had become one that

GLAMORGANSHIRE is in North Wales, and at Swanfey, a fea-port town, there is a fpring that has an acid fliptick tafte like alum, though the predomimant falt is a martial vitriol. It turns blue with Vinegar, and will not curdle with Milk. A gallon of this water yields 40 grains of fediment, of a highly acid, fliptick, vitriolick tafte, and a light brown colour, which will ferment with Spirit of Hartshorn and Oil of Tartar. It is good in loosenesses, and will stop the

bleeding of external wounds.

HERTFORDSHIRE has two medicinal Springs, at Barnet and Northall. The first is called East Barnet, and is fituated two miles fouth-east of High Barnet. Northall lies three miles north of High Barnet, and receives its name from Northaw, which is the same as North-grove, there having been a wood here belonging to the monastery of St. Alban. Both the waters feem to be of the same nature; that at Northall is a little brackish and bitterish in the throat; but is not so nauseous as that at Epsom. Barnet water is bitterer than the former, but they will both curdle with Soap, and let fall a grumous fediment with Oil of Tartar. With a folution of Alum they will let fall white grumes, which experiment shows they are not aluminous; but with Galls they turn of a wheyish colour, and with Logwood of a deep red. A gallon of Northall water will yield four drams and twelve grains of very white sediment; and a gallon of that at Barnet, 20 grains of a brackish, bitter sediment. From other experiments it appears, that both these waters contain calcarious nitre, with a small mixture of sea-salt, and a little limestone. They have both a purging quality; but they are not half so strong as that at Epsom.

KENT has a remarkable mineral Water, commonly known by the name of Funbridge Wells, which is 34. miles fouth-east of London. In a warm feafon a gas of vitriol may be perfectly diftinguished in this water; and it is generally allowed to be impregnated with volatile and spirituous exhalations. It turns of a blackish purple colour at the fountain-head with Galls,

Oakleaves, and Green Tea; but if a few drops of Spirit of Vitriol be added thereto; it will become clear again. In a rainy feason in January, a gallon will yield nine grains of sediment; but in August no more than fix grains. It is a light, and comparative pure chalybeate, and its virtues are most powerful at the fountain-head. It causes a blackish perspiration, which in time will change the linen of the drinkers to the fame colour. It purges most by stool and urine; but if the flomach be foul, by vomit. In general, it is an effectual remedy in obstructions of the glands of the mesentery, as well as in recent dropsies, as also in phlegmatick patients, whose blood is very poor. It is good in all pains, and swellings at the pit of the ftomach, though of many months ftanding. It is excellent in ulcers of the kidnies and bladder, and cures the cholick, vomiting, and the hiccough; it likewise kills worms. It strengthens the brain and nerves, and is good in convultions, the head-ach, and vertigo; befides, it cures long and tedious agues, and is good in the dropfy, black and yellow jaundice, hard fwellings of the spleen, the scurvy, and green-sickness, as well as helps fore eyes and red pimples.

Sydenham Wells are in the parish of Lewisham, and are seated upon a common near Dulwich in Surry. The water is a little bitterish, will curdle with Soap, and, with the solution of Pot-ashes, it will let fall a white grumous sediment. From these, and other experiments, it appears to be impregnated with a calcarious nitre and sea-salt, joined to a little natron and calcarious earth. A quart will yield above a dram of a palish yellow sediment, with a nauseous, bitter taste; and the salt separated therefrom has the same taste, with a little brackishness. It produces much the same effects as Epsom water, though it is not half so strong.

Dulwich water has its name from rising in the hills nearly adjoining to that village in Surry; but in reality it is in the parish of Lewisham, in the county of Kent. The water is generally clear, has a brackish taste, with a little bitterness in the throat, and will curdle with Soap; but with Oil of Tartar it will let fall a white grumous sediment. A gallon will yield three drams

of sediment of a greyish colour, and a brackish taste, which will ferment greatly with Oil of Vitriol. This water is chiefly impregnated with fea-falt, calcarious nitre, and a little calcarious earth. It is a brisk purge, and will cure ulcers of every kind, by bathing therein, all defedations of the fkin, and even leprofy itself. It is good in obstructions of the bowels, in the greenfickness, black and yellow jaundice, the cholick, gravel, piles, cachexy, scurvy, and removes difficulty and sharpness of urine, as well as strengthens the brain and nerves. The dose is three pints a day at first; but should be increased every day till it come to eight or

nine pints.

LANCASHIRE has feveral mineral Springs, among which is Carlton Water, so called from Carlton, a village ten miles fouth-west of Preston. This water is somewhat of a chalybeate, and when just taken up has a faint smell of sulphur. It will curdle with Soap and Milk, turns white with Oil of Tartar, has a pink sediment with Galls, and changes to a deep blue with Logwood. A gallon contains 236 grains of a white fediment, whereof one third part is earth. The fediment is of a brackish taste, and bitterish in the throat. and will ferment with acids. The falt is also brackish, very bitter in the throat, and emits an acid fume with Oil of Vitriol; but will not ferment nor change with Vinegar. It is a more powerful absorbent than many other nitrous waters, and three or four pints will purge brifkly.

Rougham Water, so called from Rougham, a village in Laucasbire, two or three miles from Cartmel. The fpring rifes from the bottom of a rocky mountain, and the tafte of the water is a little brackish: it turns white with Oil of Vitriol, green with Syrup of Violets, and brown with Logwood; but it continues clear with Galls. A gallon of this water yields 300 grains of sediment, of a saltish taste, will ferment with Oil of Vitriol, and emit an acid fume. The water purges briskly by stool and urine, and the common people drink it from three to eight quarts. It is of great use in bad digestions, loss of appetite, and the scurvy.

as had ment. A gallon will provide theme

WATERS, EARTHS, Fossils, and MINERALS. 25

It has cured the jaundice and a quartern ague; and is

excellent in the green fickness.

Crickle Spa rules in a village of that name, a mile from Broughton. It has a strong setid smell, and will turn Silver black in a minute. The earth it runs over is of a shining black, and yet it will turn rags, leaves, and grass, white. A gallon contains 320 grains of sediment, 12 of which are earth, and the rest are sea-salt and nitre. It is a purging, sulphureous water.

Heigh is a village not far from Wigan, where there is a water, which will ferment strongly with any alcali, will turn inky with Galls, and has likewise a vitriolick taste; a gallon yields four ounces of sediment, which confists of a variegation of white and green, with oker, sulphur, and a little copper. It works plentifully by vomit and stool, and will stop any internal bleeding.

Burnly is a town also in Lancashire, whose waters will turn Galls of a deep red in a moment, and with Syrup of Violets to a very deep green. It works powerfully by urine, and is good in scorbutick cases.

Handbridge is seated between Rurnly and Townly, which has a spring that changes Galls to a faint orange colour. The salt obtained therefrom yields a fetid, penetrating smell with salt of tartar. These two last Waters agree with the Pobun at Spa, in containing iron and natron as their principal ingredients. It purges by stool and urine, and is of great use in the gravel, scurvy, obstructions, and diseases from an acid.

At Ancliff, a village three miles from Wigan, there is a Spring called the Burning Well, which will take fire by holding a lighted candle near it. It will continue a whole day, and eggs and flesh may be boiled therein; but the water itself is cold. It is but a few yards distant from a rich coal mine, which renders it probable, that the inflammable vapour is rock oil.

There is a Spring two miles from Whaley, seven miles west of Burnly, whose stream renders Gold brighter; but turns all white metals black. The channel this water runs in is lined with a bituminous, stinking substance, and it is strongly impregnated with Vol. V.

fulphur, combined with a little calcarious nitre, a mixture of fea-falt, and of absorbent earth; but we have no account of its virtues.

Ingleswhite is a village in Lancashire, where there is a strong, sulphurious and chalybeate water, which is the product of marle. This partly resembles slate, will moulder, when exposed to the air, into exceeding thin slakes, like leaves of sine paper, and will afterwards turn to a black powder. A gallon contains 24 grains of sediment, of which 19 are earth and oker, and 5 nitre; but it will not purge unless drank with salt.

LEIGESTERSHIRE has one remarkable mineral Spring at Nevil-Holt, a village feated to the fouth of Market Harborough: the water is exceeding fine and clear, and it has a flyptick, bitter, sweetish and subacid taffe, leaving the mouth fomewhat dry. It is uncommonly brisk and sharp, when drank at the Springhead; and then also it passes quicker than elsewhere: it curdles with Soap, and lets fall a gross, white fediment with Oil of Tarter; but with a folution of Alum and Copperas, it will continue clear. Hence, and from other experiments, it appears to contain a calcarious fitre and alum, with a fat clay, a latent fulphur, and fometimes a little oker. It will cure externally fresh wounds, and all forts of ulcers; and is excellent for the eyes: used outwardly, and taken inwardly, it will cure hectick ulcers. When taken inwardly, as an alterative, an ounce or two may be taken five or fix times a day, or four ounces night and morning; but when defigned as a purge, it must be taken from one pint to three. If the constitution is cold and phlegmatick, it will be necessary to add four spoonfuls of brandy, and an ounce of sugar to each bottle of water. It is excellent in bloated, dropfical constitutions: it has no parallel in all forts of hæmor thages, as well as in all great and natural fecretions, of what kind foever. It also cures an inflammation of the lungs, attended with a cough and spitting of blood It is very successful in the King's Evil, hidden cancers, as well as fcrophulous inflammations of the eyes of many years standing. It also cures all discases of the fkin.

WATERS, EARTHS, POSSILS, and MINERALS. 27

fkin, and has had furprizing success against rheumatisms; but it must not be drank in the increase and

height of any internal inflammation.

LINCOLNSHIRE has several mineral springs, whereof one is at Cawthorp, a village seven miles north-east of Stamford, where the spring rises up in a large bason, in the middle of the street. It will turn very white with Oil of Tartar, and afterwards let fall a yellow sediment; but it will turn green with Spirit of Hartshorn. A pint will yield a scruple of a white sediment, whereof near one half is salt, and the other earth. It is a purging chalybeate, and is probably a great corrector of acidity.

In the parish of Strenfield, ten miles east of Lincoln, there is a water that is pleasant and sweet to the taste; but will curdle with Soap, and turns to a pearl colour with Oil of Tartar. A gallon of it contains four scruples of a white sediment; whereof 44 grains are earth, 30 nitre, and 8 sea-salt. It is found effectual in curing obstinate fluxes, and the diabetes; as also all internal hamorrhages, and profuse night

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Gainsborough is a market-town in Lincolnshire, seated on the river Trent, 14 miles north-west of Lincoln. The spring rises to the south-east of the town, and smells and tastes like steel and sulphur. A gallon yields 192 grains of sediment, whereof 120 are earth, and 72 calcarious nitre: it has somewhat of a pur-

gative quality.

Hartikein

MIDDLESEX contains several mineral waters, of which one is at Acton, a large village, eight miles west of London, which is a purging-water, though it is very clear and without smell. The taste is a little nauseous, like a weak solution of Epson salt: it will curdle with Soap, and with Salt of Tartar it produces a white grumous cloud. Oil of Virriol and Spirit of Salt will excite a small fermentation, and with Syrup of Violets it will turn to a light green. A gallon will yield 344 grains of sediment; it is very white, and of a nauseous bitter taste: it will ferment very briskly with Spirit of Salt, and the proportion of the salt to the earthy matter is as 73 to 4: from other experiments

at appears, that this water is chiefly impregnated with a calcarious nitre, and a small proportion of absorbent earth. It is accounted one of the strongest purging waters near London, and is noted for causing a great foreness in Ano.

Pancras lies on the north-west side of London, and in the road to Kentisto-town: the water here has scarce any taste, till one half is evaporated, and then it becomes bitter; with Oil of Tartar it will deposite a copious white sediment; but with the solution of Alum there will be a small grumosity. Acid spirits will produce a small fermentation; and with Syrup of Violets it will turn green. A gallon will yield five drams of whitish sediment, which has a saltish and strongly bitter taste in the throat: from hence it is concluded, that the impregnating salt is a calcarious nitre, and it is considerably diuretick, and somewhat purgative.

Shadwell Water is found in the Sun Tavern Fields. about two miles eastward of the Tower of London, and about half a mile from the river Thames. It is of an amber colour, with a strongly acid and styptick taffe. It ferments for some time with Oil of Tartar, and lets fall a large ochreous fediment; but with the folution of Alum it continues clear. It will turn a copper half-penny black on the furface, and a knife black, blue, and rufty. A gallon contains 1320 grains of a white and yellowish sediment, which has a highly acid and austere taste. The predominant falt of this water is highly acid and vitriolick, with a combination of sulphur. This water has been chiefly used externally; but if a pint of it be drank at twice, in the space of an hour, it will produce a gentle vomiting, and two or three stools: it has done a great deal of good in all difeases of the fkin; and some fay it will cure fistulas, stubborn ulcers in the legs, and fore eyes, by dipping linen rags in the water, and applying them to the parts affected: taken inwardly, it stopped internal bleedings, and has perfected the recovery from camp dyfenteries.

Hampflead is well known to be a large village, or rather town, five miles north of London; and the water that is found there was formerly in as great reputation, as that at Tunbridge. It will lather with soap, but undergoes no alteration with Spirit of

Hartshorn; and yet it will serment with Oil of Vitriol, and grow warm and smoak. It will keep milk sweet for four days, and will turn purple with Syrup of Violets; likewise, with half a grain of Galls grated, it will turn of a fine deep purple. A gallon will yield about five or fix grains of a kind of saline concretion, mixed with a yellowish earth, that will taste somewhat like vitriol of steel. It works chiefly by urine, and has been found good in want of appetite and indigestion: it is also good in vomitings, cholicks, nervous and hysterical disorders, raising the spirits greatly. It is serviceable in the sluor albus, in weakness from miscarriages, and in the scurvy and all diseases in the skin: it is proper in obstructions of the mesentery, bladder and skin; and also in some paralytick disorders.

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New Tunbridge-Wells are near the New-River-Head, at the entrance of Islington, on the fide next London. The water has the talte of iron, and is a little flyptick, with some degree of quickness both in smell and taffe, especially in the summer season. It will lather with Soap, and turn a little milky with a large proportion of Oil of Tartar; but it will not let fall any fediment with volatile alcalies. A gallon will yield from 10 to 30 grains of a reddish earth, which will ferment with Oil of Vitriol. It is a light and comparatively pure chalybeate, of confiderable firength at the fountain head, where it ought to be drank. It is of great efficacy in all nervous diforders, and reftores the strength after violent acute diseases: it opens all obstructions in women, and is excellent in a dropfy; in which case the dose is from half a pint to a pint, and no more. It opens obstructions of the glands, and is of some service in reducing corpulent habits

NORFOLK has but one remarkable mineral Spring, which is at Thetford, a market-town of great antiquity: the water appears to have somewhat of iron; for Galls will turn it first purple, and then black. It will let fall spontaneously a dram of an earthy substance of the colour of oker, which being calcined in a crucible, some of its particles may be attracted by a load-stone. From other experiments, it appeared to be impregnated with iron, sulphur and natron; it works gently by stool and urine, and sharpens the appetite:

C

it reftores loft firength, and cures pains of the flomach, and of the head, as well as fainting, vomiting, convulfions, and indigestions, difficulty of breathing, and the beginning of a confumption; it also kills worms.

NORTHAM HTONSHIRE has three mineral Springs, whereof one is at King's-cliff; eight miles fouth of Stamford, and it both fmells and taftes of iron. It will let fall a white fediment with Oil of Tartar, and with Galls it precipitates a purple sediment; but turns of an opake red with Logwood, and of a deep green with Syrup of Violets. A gallon yields 140 grains of fediment, 75 of which are limestone and oker, and 6s a calcarious nitre. From various experiments it appears, that this water is of a chalybeate, laxative nature, impregnated with iron and calcarious nitre, with a small quantity of sea-falt, and a calcarious earthy fubstance. It will not purge a strong person, unless he drinks from three to five quarts; but it has been used with great success, in disorders from obstructions; and in eruptions of the fkin; it has also cured feveral lame persons.

Aftrop is a village in this county, four miles foutheast from Banbury in Oxfordsbire; and the mineral water here is a brifk, spirituous, clear, and well-tasted chalybeate. It lets fall a white fediment with Oil of Tartar; and a gallon, after evaporation, yields 17 grains of fediment, containing nitre and calcarious earth. Drank at the fountain head, it is a certain cure for all female obstructions, and in the first and second stages of confumptions. It seldom fails in the jaundice and beginning of a dropfy, and restores a constitution weakened by hard drinking : the dose is very large, that is, from three quarts to five in the forenoon; and some affirm it will cure madness and melancholy.

In the parish of King's-Sutton, four miles fouth by east of Banbury in Oxfordsbire, there is a mineral Spring, that has an intolerable strong smell like rotten eggs; but the tafte is faltish, warm and pungent, like Suit of Tartar. A gallon yields 166 grains of fediment, of which nine are earthy, and the relt falt, of a pungent, brackish and bitter taste, with all the characteristicks of an Alkali. It is a purging water,

strongly

WATERS, EARTHS, FOSSIES and MINERALS. 31 trongly impregnated with fulphur, and an alcaline falt nixed with sea-salt. It is famous for discussing and ealing of tumours, ulcers, and all diseases of the skin.

Nottinghamshire has a mineral Water at Kinalon, nine miles fouth-east of Nattingham. It is clear, bleasant, cooling, and a little saltish; it grows white and curdles with Oil of Tartar; but undergoes no alteration with acid spirits, and will turn of a beautiful light red with Tincture of Logwood. A gallon will yield 280 grains of a beautiful white sediment, the sourch part of which is a fine alkaline earth; and in the remainder is a remarkable pure, clear nitre. This is a purging water, that has not above half the portion of contents as Epsem water.

nor will it work unless drank plentifully.

At Orfon, 12 miles east of Nottingham, there is a mineral Water, which, as it rifes out of the spring, has a sweetish chalybeate, and a little roughish taste; but, when it has flood for some time, it becomes rough and harsh. A gallon yields 128 grains of sediment, of which the portion of the earth to the falt is as 27 to 9. The Water is a rich chalybeate, with a confiderable quantity of fulphur, if drank as it springs up; but the predominating falt is a calcarious nitre, mixed with a small quantity of fea-salt. It will purge those of a gross habit of body, and will turn the throat, tongue, and stools of the drinkers, perfectly black. It is good in the hypochondriack melancholy, feurvy, want of appetite, indigestion, pain of the stomach, costiveness and stoppage of urine. It is also good in the beginning of obstructions of the bowels, and likewise in ulcers of the lungs, and spitting of blood.

In Oxfordshire is Chadlington Water, in a village of that name, three miles fouth of Chipping Norton. It smells like the washings of a foul gun, and a gallon yields 90 grains of sediment, of which seven are earth, and the rest a peculiar fort of nitre: From other experiments it is found impregnated with sulphur, and an alkaline salt mixed with sea-salt: it is accounted

a purging water. The printing to join apple

Clifton is a village two miles east of Doddington, where there is a clear water that affords a sediment, which vields

yields a peculiar kind of nitre, inclinable to an aikali. It is laxative, and is used to cure diseases of the skin in

men and cattle, by bathing therein. Madoz 11.01

Doddington is a small market town 16 miles north of Oxford, where there is a strong sulphureous water, that simells like the washings of a foul gun. A gallon yields 87 grains of sediment, whereof 44 are earth, and 43 falt. It is impregnated with sulphur and iron, both of which are very volatile; besides which, it has salt

RADNORSHIRE, in Sourb Wales, has very remarkable mineral Waters at Llandridod, which is 24 miles west of Lempster in Herefordsbire. Here there is a common fix miles long and three quarters broad, and in that part of it tying in the above parish are the mineral Springs. These are the saline pump-water, the sulphureous water, and the chalybeate rock-water. The air is exceeding healthy, insomuch that weak and consumptive people, that come here to drink the waters, soon revive and gather strength. These Springs are now frequented by very genteel company, and in the summer-time the common people resort here in crowds.

The Rock-water is so called, because it issues out of a rock, and a glass of it taken up in a clear warm day, is as bright as cryftal; but after it has flood some time. it changes to a pearl-colour. While it continues clear it has a ftrong chalybeate tafte and fmell, but they forfake it as it changes colour; at the spring head, it turns to a deep purple with powder of Galls, and becomes hot with Oil of Vitriol. However, it will not curdle Milk; but with Oil of Tartar it becomes as white as milk, which afterwards changes to a vellowish green. It preserves its transparency with acid spirits; but with Sugar of Lead it turns first milk white, and at length lets fall a yellowish grey sediment, from a quart of water, which after it has been analysed, is found to contain about 15 grains of crocus of iron; and about 5 of the bituminous mucilage of iron. From hence, and various other experiments, it is concluded, that this water contains iron, falt, sulphur and vitriol. It is good in all chronick diftempers proceeding from a laxity

laxity of the fibres, particularly in scorbutick eruptions and weakness of the nerves, and disorders proceeding from the brain. It is also efficacious in obstinate agues, obstructions of the bowels, slow nervous

fevers, and in all female diforders.

The faline purging water is called upon the fpot the Pump-water, and from various experiments it appears to contain a neutral falt like native borax, a small quantity of bitumen, and an etherial, elaftick, volatile mineral spirit, and a mineral oil. It is excellent in all diseases of the skin, and in such disorders as proceed from corrupt humours; but if the disease is obflinate, it requires some time to cure it radically. Persons troubled with the scurvy, must use the water both as a purgative and alterative; and, for the last, a pint and a half should be taken at three doses, in the morning before breakfast. As a purge, half a pint must be drank at a time, till it begins to work. In diseases of the skin the patient must bathe frequently, and wash the parts affected with the water, and particularly, in the leprofy, fo much water must be drank, as to cause two or three motions every day; to which must be joined bathing twice a week in a warm bath. made with equal quantities of the pump and fulphureous waters. In the gravel, the patient must drink fo much as will give him two or three stools, and when the gravel is discharged by this means, the patient must drink every morning half a pint of the rock water, and half a pint of the pump-water; also half the quantity going to bed.

The Sulphureous Water, commonly called the Black stinking Water, has its name from the strong smell, and the blackness of the channel through which it passes. It smells like the washings of a foul gun, and has the strongest smell in rainy weather. From various experiments, it appears to contain etherial, volatile, mineral spirits, a small quantity of a vitriolick acid, a mineral, unctuous mucus, a sine mineral oil, a subtile crocus, a perfect sulphur, and a neutral salt, of a bring, calcarious nature. It is of great use in all cases, where bathing is proper, made into a luke-warm bath. It is excellent in benumbed limbs, in wasting of the

flesh, and in nervous disorders; as also in old fores, tetters, and in all diseases of the skin; as well as in the stone, gravel, rheumatism, and gouty distempers. Drank inwardly, and used outwardly, it cures the King's Evil, and is an excellent abforbent, infomuch that it is efficacious in forenels of stomach, obstructions of the liver, and in the jaundice: it is also good in contractions and weaknesses of the limbs, and in broken conflications from hard drinking. The dose cannot be determined, and therefore it is best to begin with drinking from a pint to a quart in a morning, that is, about half a pint at a time, with fhort intervals between the draughts; the quantity may be increafed to as much as the constitution will well bear, that is, as much as will fit easy on the stomach, and pass off well.

SOMERSETSHIRE is remarkable for having two of the most noted mineral Waters in the kingdom, those of Briftol and Bath, befides others of different kinds : that at Briftol issues out of a rock, and in that city is called the Hot-well Water. It is feated on the north fide of the river Avon, where there is a romantick and beautiful prospect. When first drawn off, it is of a whitish colour, at least sometimes, which it loses gradually as it grows cold, and many fmall bubbles arise in it when taken from the pump. The taste is exceeding foft, pleafant and milky, at the spring head, and is very agreeable to the flomach; but it leaves a fort of Stipticity on the palate. It is entirely without smell, and is only lukewarm to the touch. It keeps well in bottles that are properly stopped, losing only a part of the elastick air, which slies off before the corks can be put in.

With regard to chemical experiments, if a glass of water is poured upon a few grains of Sal Ammoniac, it immediately disfolves it, with a very sensible effer-vescence. Oil of Tartar not only produces the same effect, but renders the water milky, which after it has stood a-while goes off, and lets fall a light earthy precipitate. Dissolved Soap, dropped into a glass of water, immediately curdles, and in a short time the surface is covered with a greasy substance, and the water

below

WATERS, EARTHS, FOSSILS and MINERALS. 35"

below becomes turbid. Twenty drops of the Solution of Silver, mixed with three ounces of the fresh water, in three hours made it appear as if a small quantity of

ink had been dropped therein.

These, and other experiments, seem to declare there: is some degree of an acid in the Briffol water, though not discoverable by the taste; there is also a small portion of sulphur, because when bottles filled with this. water happen to be broken, it will flink very much. A gallon contains about 34 grains of fediment, which is of a light grey colour, of a brackish taste, and bitter in the throat. This will ferment with acids, and turn green, after some time, with Syrup of Violets. The Talt is white, but will not ferment with diffilled vine-

gar; and in the air it will grow damp.

Briftel water is generally allowed to be cooling, cleanling and balfamick, with a confiderable degree of affringency, which renders it excellent in the diabetes: it will also open the urinary passages, obstructed by gravel. It is useful in many chronick diseases, that will not yield to a common course of medicine, and it is serviceable in many internal inflammations. It ftrengthens the stomach, promotes an appetite, assists digestion,.. and will cure the first stages of a consumption. It is good in diforders of the eyes, and will cure ulcers. therein, if taken warm from the pump, and applied with a foft rag: it has also cured many scrophulous ulcers, by washing them in this water, others fay those of the cancerous kind, drinking the water at the fame : time: it has also been found successful in the bloodyflux, all internal ulcers, preternatural discharges, and bleedings of every kind.

The method of drinking the water, when the patient first comes down, is to go to the pump-room in the morning, and drink a glass or two before breakfast, as also about five in the afternoon; the next day the patient takes three glasses before breakfast, and three inthe afternoon; and this course is continued during

his flay at the Hot Wells.

Bath water, when viewed by itself in a small quantity, appears clear and transparent; but when beheld in the Bath, the surface is of a sea-green colour. The C. 6

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fmell is not very agreeable, especially in the Hot Bath; but when quite fresh it has a soft and milky taste. There are four Baths in this city, which differ from each other, chiefly in their degree of heat; namely, the Cross-Bath, the Hot-Bath, the King's-Bath, and

the Queen's-Bath.

With regard to the experiments made with it, it is observable that when carried at a distance from Bath, it will precipitate Silver out of Spirit of Nitre into a hardish curd: but not so much as common salt: however, it is concluded from hence by fome, that fea-falt predominates in Bath water. The King's-Bath, and Hot-Bath, will turn the folution of Silver white. with a bluish cast, which becomes gradually more dusk-coloured, and then deposites a dark grey sediment. The folution of English Vitriol, mixed with this water, turns to a pearl-colour; that is, with the King's-Bath and Hot-Bath, and both will be covered with a thin variegated pellicle. With Oil of Vitriol, and other acids, the Bath waters will excite some intestine motion, and greatly blunt the acidity. If one part of boiling Milk be mixed with two parts of Bath water, a thin whey and curd will appear, if the water be just taken up. A dram of Syrup of Violets will give a grass-green colour to an ounce of the King's-Bath water, as well as of the Hot-Bath in 24 hours time.

Some experiments shew there is a vitriolick principle in the Bails waters; for if they be taken fresh from the pump, in clear frosty weather, Galls will tinge them of a purple colour; but when cold, they scarce make any alteration at all. It is generally thought to be owing to the ferruginous principle of Bails water, that it will make better and blacker ink than common water. Likewise the sand of the Baths, exposed to the air for some time, will become vitriolick, and make ink with insusion of Galls. That there is an oker in this water, appears from the yellow colour of the stones in the bottom of the Bath, and from the yellow matter like thin cream floating on the surface of the water, in the winter time.

From these and other experiments it is concluded, that there is a mixture of calcarious substance with the oker; and the mud is found to consist of a bluish clay, with some testaceous particles; when it has been used as a cataplasm, it has somewhat of the smell of sulphur, and when rubbed on silver it changes it black. The sand, thrown on a red hot iron, emits a blue stame with a sulphureous smell, and being exposed to the air becomes vitriolick, as before observed.

A gallon of the Queen's-Bath water will yield 155 grains of sediment, the Hor-Bath 139, and the Cross-Bath 130. The quantity of a calcarious and argillaceous substance is double to that of the saline; the quantity of salt in each gallon searce exceeds 43 grains, and the rest of the matter is a grit, with a blue sulphureous earth or marl. The gross remainder emits a strong sulphureous smell, with a blue slame upon calcination; and by this operation a sourth part of the weight is lost, by burning away. The result of all the observations of different Physicians plainly shew, that the minerals in Bath water consist of a calcarious and marly earth and oker, a marine or sea-salt, a little calcarious nitre, a glass of vitriol, a little bitumen, and a very small quantity of sulphur, which last can be made to appear no otherwise, than by consequences.

The Bath Phylicians are agreed, that the Bath waters are useful in all diseases of the head and nerves, fuch as convultions, palfies and epilepsies; in all difeases of the skin, obstructions of the bowels; in scirrhofities of the liver, spleen and mesentery; in most diseases of women, and in the scurvy and stone. The Bath waters are certainly a most powerful deobstruent, and their energy is fo great, and their operation fo fudden, that a very exact preparation of the body is required, and a firster regimen than in drinking other waters. Likewise, a regard must be had to the habit of body, the feafon of the year, the fymptoms of the difease, the changes of the weather, and the different degrees of hear in the feveral Baths. As for inflance, the heat of the King's-Bath, without due precautions, is apt to inflame the blood, hear the bowels. and fometimes cause a fit of the gout. As to the manner

TURNETT

manner of the operation of Bath waters, whether by bathing or drinking, or both, their effects are thus enumerated. Externally, they will heat, dry, attenuate, refolve and strengthen, and have a fingular virtue in difeases from a cold and moift cause. They ease pains, disperse cold tumours, dry up moist ulcers, and are very advantageous in phlegmatick difeases. It is also remarkable, that nothing more effectually prevents too great a corpulency than the frequent use of these Baths. Bathing cures contractions and relaxations of the limbs, restoring lost sense and motion; but it is not proper in a fit of the gout, except in the decline of that distemper. It is also highly ferviceable to those, whose sinews are impaired and crippled by the fevere fits, and their frequent returns.

The Bath waters taken inwardly, to two or three quarts, commonly give two or three stools extraordinary; and it is remarked of the Hot-Bath, that it generally keeps the body open, while the King's-Bath has a contrary effect. When they are used as an alterative, they dilute, attenuate, sweeten, strengthen and heal, correcting the acrimony of the first passages, and curing the many disorders of those parts. They supply a want of spirits, and are good in diseases, where the secretions are diminished, as well as in all cachectick and scorbutick habits of body. They are very fuccessful in hypochondriack disorders, and melancholy, as well as in diforders of the urinary passages. particularly sharpness of urine, the strangury, gravel, and ulcers of the bladder. The usual time of bathing and drinking these waters is generally five or fix weeks, and, in obstinate cases, they must be repeated every year. The common quantity drank is from a pint to a quart and half a pint a day; but fome have been allowed to drink a gallon every day, and then the patient must begin with small doses.

Alford is a village 24 miles fouth of Bath, and is remarkable for its mineral water, which has a naufeous bitter tafte, and will curdle with foap, as well as yield a white grumous fediment with the folution of Pot-affices. It turns of a dilute green with Syrup of

Violets, and Galls will produce a greenish cloud on the surface, which descends deeper in two or three days. A gallon will yield fix drams of sediment, confisting of calcarious nitre and sea-salt, with a little lime-stone. It is cooling, cleansing, and penetrating, will attenuate gross humours, destroy acrimony and temperate ebullitions of the blood; hence it is good in the scurvy, jaundice, and all sorts of obstructions. It cleanses the urinary passages, purges briskly, and

promotes urine and fweat.

Lincomb Water is feated near Bath, and the water is by some called Lincomb Spa. When first taken up, it has a light, brifk, fulphureous fmell, which it lofesin fix or eight minutes time; but its tafte of iron is more lasting, that is, for the space of eight hours. It is transparent at first, but becomes bluish with standing, and throws up to the surface a thin, variegated unctuous fcum. From various experiments it appears, that this water is impregnated with iron and a little fulphur, as also with bitumen, and a small quantity of alkaline falt. It passes off quickly by urine, mendsthe appetite, and raises the spirits. It is serviceable in disorders of the first passages, and is good in cachexies, the jaundice, and recent obstructions of the liver: it also deterges and heals ulcers of the kidnies, and removes the strangury. Outwardly, it cleanses and heals scrophulous ulcers, dries up sharp humours, and cures foulneffes of the fkin.

Queen's-camel is a village five miles north of Sherborne, where there is a spring that proceeds from a hard rocky bank, and is called the Black-Well. It smells like the washings of a foul gun, and, from the trials made with it, appears to contain a considerable quantity of sulphur, some natron, and a calcarious earth. It cures, by bathing, scorbutick, leprous and scrophulous disorders; and it has been observed to cure dogs of the mange, by dipping them therein.

STAFFORDSHIRE has only three mineral waters, whose virtues are ascertained, one of which is at Codfall, a village 12 miles south-west of Stafford, that is in the wood adjoining thereto, which is a sulphureous spring, and the sulphur is mixed with falt, but not sufficient

fufficient to reftrain the volatility of the sulphur, so that in the winter, before rain, it may be smelled twenty yards off. It will lather with Soap, will not curdle Milk, and with Syrup of Violets will turn green; but neither Galls, Oak-leaves, nor a solution of Sublimated Tartar, would throw down the sulphur: however, Spirit of Urine did, and turned it of a faintish red. When leprosies were more frequent, this water was famous for curing them; but at present it is only used in scrophulous cases, and it operates both by stool and urine. They brew their beer with this water, and in Dr. Plas's time there was a house, called the Brimssone-Alebouse, where no one that lived there was troubled with dileases of the skin.

St. Erasmus's-Well is in the grounds belonging to the Lord Chetwynd, near Ingestre, two miles from Stafford. The water is clear, and of the colour of Sack, but has no remarkable taste, nor smell. A gallon of this water will yield 300 grains of sediment, whereof 272 are salt, and the rest moss. We are not told what diseases it is used for, nor indeed that it is

used at all.

Willoughbridge is fix miles north-east of Drayton in Shropsbire, and in the park near it there is a well, whose water is as clear as crystal; but it renders the fides of the glasses, after they have been used awhile, a little oily, and of a bright yellow colour. If a few drops of a folution of Sublimate be let fall into this water, it prefently becomes of a deep fack-colour, which feems to shew it has somewhat of a lixivial salt. It will lather with Soap, but will not curdle with Milk, nor change colour with Syrup of Violets. Contrary to most other waters, it leaves nothing behind it, after the evaporation of several gallons. Its oil or sulphur is so very volatile, that when distilled in a glass body and head, the Oil of Sulphur comes over the helm, upon the first heat, and is always in the receiver, before the least drop of water appears. There is such plenty of this water, that at least 60 Springs have been counted, that fend forth plentiful streams. Dr. Plot informs us, that thefe waters have performed many wonderful cures, which he attributes to its balfamick virtue.

virtue, and its great subtilty and volatility; and he farther adds, if we were to judge of the waters, from the many attested cures, it bids as fair for an universal medicine, as any thing else in the world.

SHROPSHIRE has a mineral water at Moreton, a village two miles west of Market Drayton, which will not lather with Soap, but curdles Milk, and yields a white sediment with Oil of Tartar; it turns green with Syrup of Violets, and scarlet with Logwood. A gallon of this water will yield 277 grains of sediment, whereof 76 are earth, and the rest a calcarious nitre. It is an excellent cooling diuretick and cathartick, and purges very briskly. It bears a great resemblance to Hole water, only the taste is more pungent, and consequently it is very sikely to have the same virtues.

Pitchford is a village fix miles fouth by east of Shrewfury, which takes its name from the pitchy foring that is found there, on the top of which there floats a liquid bitumen, though it is scummed off every day. It is found to be excellent for wounds, and will

cure inveterate scrophulous ulcere.

Brofeley is a village four miles north-east of Wenlock, and has a burning Well, which was discovered about the year 1711. A candle being put down into the well, it will take fire at the distance of a quarter of a yard, darting and stashing in a violent manner, to the height of 1820 inches. It is hotter than common fire, and boils any thing much sooner. It appears to be impregnated with a fort of liquid bitumen.

In Surry there are several mineral waters, the most famous of which is at Epsom, a town about 15 miles south-west of London. The water is pretty clear and without smell; but if it be kept in covered vessels for some weeks in summer, it will stink, and acquire a nauseous bitter taste, with somewhat of a maulish saltness. It will curdle with soap and salt of Tartar, and with spirit of sal Ammoniac it will let sall a grumous sediment; but if mixed with sime-water, it will continue clear. A gallon will yield an ounce, sometimes an ounce and a half, of a fort of cream and sediment; which is of a greyish colour, almost impalpable,

palpable, of a brackish, nauseously bitter taste, and an odd strong slavour. There are about eight parts of salt to one of earth, the former of which is of a whitish yellow colour, and of a singular strong smell, with a nauseous bitter taste. All authors agree, that the crystals of this salt will require but a small proportion of water to dissolve them, for an equal weight has been found sufficient. The salt has a purging quality, for half an ounce, dissolved in spring water, will work like other physick. The water itself is a diluent, and a mild absorbent: it is also diuretick and cathartick. Poor people formerly used to wash old fores with the water, with a good effect. A dose of the water, in summer, is two-thirds of a pint, and in

the winter, half a pint.

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Stoke is a village two miles fouth of Cobbam, where there is a spring commonly called Jeffep's-Well. This water is thought to contain more falt that any purging water in England, and it has a taste much like that of Epjom-Wells. A gallon of this water yields an ounce and a half, with 22 grains of fediment, that is, 742 grains in all. It is very white, and has somewhat of a brackish taste, with a nauseons bitterness. The earthy matter bears but a small proportion to the falt, which, as Dr. Hales informs us, will shoot into very hitter, irregular oblong crystals, some of which have retained their former firmnels, for five years at least. Half an ounce of distilled water will distolve only to grains of falt, though standing by the fire-fide, in which it greatly differs from that at Epfom. From the experiments made with it, it appears, that this water contains a large proportion of calcarious nitre, a little falt and calcarious earth, and very probably a little natron. A less quantity will suffice for a dose than of any other; for which reason it sits better on the stomach, and enlivens the spirits of those that drink it. It has been long noted as a good purging water; for a fingle quart will purge pretty brifkly, and promote plenty of urine without gripes. It cures obstinate scorbutick cases; and, as some think, there is a fine volatile spirit in the water; it may be drank for a confiderable

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WATERS, EARTHS, FOSSILS and MINERAGS. 43,

quences.

Stretham is a village fix miles fouth of London, that, has been long remarkable for its medicinal spring. The water has somewhat of a yellowish tinge, and throws up a seum variegated with copper; blue and green colours. At the spring head it has a saline nauseous taste, and a gallon will yield zoo grains of sediment, the salt of which has a penetrating, brackish taste, with a strong slavour, and in the air it will almost melt. This is partly marine, and partly nitre, enveloped with a little sulphur, and a greater proportion of absorbent earth. When it was most in vogue, three pints boiled to a pint and a half were given as a purge; for it operates both by stool and urine, and it has been found good in disorders of the eyes.

The Dog-and-Duck is a noted publick house in St. George's-Fields, in the parish of Lambeth near London. The water is clear, and has very little tafte; but a gallon will yield 200 grains of fediment, of a dirty colour, and a pungent, brackish taste. The earthy matter is as one to twelve, in proportion to the falt, and it will ferment strongly with Spirit of Salt and Spirit of Vitriol; but will not turn to perfect lime by calcination. This water has been noted for curing leprous disorders; and some have affirmed, that it cured an ulgerated cancer in the breast by drinking the water, and keeping a cloth, wet therein, always over it. Being drank from one pint to three, it generally purges easily and briskly, without affecting the strength, unless in very tender constitutions. It may be taken as an alterative, instead of common drink, for the cure of fcorbutick pimples, tetters, the leprofy, and the King's Evil. It is also a palliative cure in caucerous diforders, and has been the means of prolonging the lives of feveral. The only fault of this water is, its being too cooling, for which reason it is prejudicial to persons of phlegmatick constitutions, and of weak habits of body.

and Guildford, and is feven miles fouth-west of Kingflow. The water has a sensible taste of iron; and a

gallon will yield feven grains of a substance like oker. which a loadstone will attract, without calcination. It is a firong chalybeate, and deferves to be more known.

WARWICKSHIRE has two mineral Springs, one of which is at Lemington, three miles fouth-west of Dunchurch, and is of a faline nature. A gallon yields 960 grains of fediment, 30 whereof are calcarious nitre, and the rest sea-falt. It is a strong purge and vomit, and is drank by labouring people from two quarts to three. It is noted for curing fore legs, and difeafes of the fkin.

Ilmington is a village feven miles fouth of Stratford upon Avon, and the water found here, though it has a brackish taste, is one of the strongest chalybeats in England. It sparkles at the spring head like bottled cyder; but it will not curdle with Milk, and yet Oil of Tartar will procure a small coagulum, It will turn purple or black with Galls, according to the quantity; but with Syrup of Violets it changes to a green. A quart of Water will yield near a (poonful of a reddift) white powder, that will ferment and fume with scide. Those that drink this water have their stools tinged blackish, and though it generally operates by urine, it will fometimes purge. Internally, it is good in the feurvy, obstructions of the bowels, the jaundice, and beginning of the dropfy; it is also good in the strangury, and difficulty of making water.

WESTMORELAND has a mineral Water at Kirkby-Thower, a village eight miles east of Penrith, which is a weak purging chalybeate. It is exceeding clear, fweetish, and has a little taste of tea. It grows whitish with alkalies, and turns to a clear purple with the Solution of Silver; but it becomes of a pink purple with Galls, a red purple with Logwood, and a deep green with Syrup of Violets. A gallon contains 190 grains of fediment, of which 140 are lime-stone, and go a calcarious nitre. The falt will not dissolve entirely in 48 times its own weight of distilled water; but it will turn of a pale green with Syrup of Violets. This water is a more powerful absorbent than any

other

WATERS, EARTHS, FOSSILS and MINERALS. 45

other of this kind, and it will purge well, if drank

to the quantity of three or four quarts.

Shapmore is a marshy heath, lying between the mountains to the north of Shap. The water here feems to be of a fulphureous nature, for it has a ftrong fetid fmell, and a fentible bitterness; but this foon goes off when it evaporates over the fire. It will curdle with Soap, and let fall a large white fediment, with the Solution of Pot-ashes. A gallon will yield 376 grains of a faline fediment, with a small proportion of very white earth. It is very white, and has a falt, pungent, bitter tafte, growing moist when exposed to the air. This water has been casually found to work by stool and urine, and three pints have proved a very firong purge. It will cure inveterate piles, and is used by the common people to cure rheumatick pains in the joints, by rubbing it warm on the parts affected.

Wisherlake is a village seven miles south-west of Kendal, where the mineral spring has a saltish taste, and in summer smells a little like sulphur, throwing up a whitish scum. With Oil of Tartar it lets sall a pearl-coloured sediment, and with Galls it precipitates one that is purple. A gallon yields 547 grains of sediment, consisting chiefly of sea-salt and a calcarious earth, with a little mixture of a bitter, purging salt. From experiments made with it, it appears that it is chiefly impregnated with sea-salt, combined with a kind of calcarious nitre, a little iron, and a small quantity of sulphur. It has been sound of great use in the stone, gravel, worms, want of appetite, the cachexy, jaundice and dropsy.

WILTSHIRE has a mineral Spring at Chippenham, lately taken notice of, and was found in a garden near the river. At the spring head it has a brisk ferruginous taste, and turns of a claret colour with Galls. A gallon will yield 39 grains of a sediment of the colour of oker, which has a very brackish taste. It contains a strong sea-salt, and a natron combined with iron. It has cured scorbutick disorders, besides others that are not particularly taken notice of.

West-Aston is a hamlet in the parish of Steeple-Aston, four miles east of Trowbridge, which has a

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fpring that yields plenty of water all the year round. It is clear, and will deposite a small quantity of sediment, after it has been kept several months in bottles. It will curdle with Soap, and lets fall a white grumous sediment with the solution of Pot-ashes. A gallon will yield two drams and two scruples of a whitish sediment, with a saline bitter taste and warmness on the tongue. It is chiefly impregnated with sea-falt, nitre, and a little iron, with a small matter of sulphur. The water is best drank at the sountain head, and three pints is purging and diuretick.

Road is a village eight miles north of Bath, where there is a mineral Spring, whose water has a chalybeate and sulphureous taste and smell. A gallon will yield near a dram of a yellow coloured sediment, that has a salt and pungent taste. The water appears to be impregnated with iron, sulphur, and a strong, native alkali or natron. It is a very gentle purge, and is good in scrophulous cases and diseases of the

Ikin; it will also cure scorbutick ulcers. Holt is fix miles east of Bath, and is of note for "its medicinal fpring, first taken notice of in the year 1713. It will let fall a gross, grumous sediment with Oil of Tartar, and when mixed with Spirit of Sal Ammoniac, a white crufty substance adheres to the fides of the glass. It will not lather with Soap, but will ferment with Oil of Vitriol. With Syrup of Violets it will become greenish, and with Galls change to a green. Logwood turns it to a deep red, Brazil Wood to a scarlet, and Rhubarb to a pale amber colour. A gallon will yield 176 grains of very white fediment, which has a faltish, bitter taste, and will grow morft in a damp air; but the earthy part is nearly equal to the falt. This water principally contains a calcarious nitre, and the operation is more mild than other fprings of this kind, on account of a large quantity of earthy matter contained therein. In small doses it is an alterative and diuretick but two quarts will purge pretty brifely. It will diffate, cool, absorb and firengthen, and is used both externally and internally. Rags, or a founge, dipped therein, will cure fcrophulous ulcers, attended with carious bones; but then it must be taken inwardly at

the fame time. It will also cure inveterate running alcers of the legs and other parts, and diseases of the kin, attended with great heat and corrofive humours. It is good for fore eyes, the piles, and ulcers of a cancerous nature, used outwardly and drank inwardly. It never fails of procuring an appetite, and will strengthen the relaxation of any part.

YORKSHIRE has several mineral Springs, of which the principal one is at Malton, otherwise called New Malton, that lies in the road from York to Scarborouph. The fpring lies at the west end of the town, and is fo strongly impregnated with iron, that it is called the Mallon Spa. Seven pints contain three drams and a half of a reddish brown fediment, which has an auflere bitterish taste, and a salt of a calcurious nitte. though different in some sense from others; for it will not ferment with Oil of Vitriol, nor Spirit of Salt: but it will turn greenish with Syrup of Violets. The mud and scum of this water will dry up and heal old ulcers, scabs and tetters to a wonder. Internally, the water works agreeably by flool and urine, unless the fromach be foul, and then it will comit the first day or two. The common dose is from three pints to fix; but fome think smaller doses would be more proper. It is good in the hypocondriack melancholy, in an assume with spitting of blood, and in internal ulters and bleedings. It is also recommended in obstructions of the bowels, and in a relaxation, weakness, and languidness of the body, it being a fliengthener and a deobstruent as well as a purge.

Croft is a village in the North Riding of York Bire. on the confines of the bishoprick of Durbam, where there is a foring of line, clear, sparkling water, with a strong smell of sulphur. A gallon yields 177 grains of a very white lediment, which has a firing Imell like that of hawthorn flowers. It confifts of limestone, nitre, and fea-falt; but the nitre is double or treble to the latter. It is a purging water, if drank from four pints to nine, and is faid to have performed many eminent cures, both by drinking and bathing.

Harrogate is two miles north-west of Knaresborough. in the West Riding; it is supposed to be the strongest fulphureous

fulphureous water in Great Britain. A gallon of that commonly drank, for there are three wells, contains two ounces of pure fea-falt, and near two fcruples of earth; therefore the predominating falt must needs be marine. A warm bath made with this water cures aches, bruises, strains, lameness, weakness of the back, beginning of the dropfy, and paralytick pains and weaknesses. It also dissolves hard swellings, cures old ulcers, and all diseases of the skin; it has also great power in eafing the gout and fciatica. Internally, drank from three to four pints, it purges brifkly, and raises the spirits. It powerfully cleanses the flomach and inteffines, killing all forts of worms; besides which it will cure the cold scurvy, and help the jaundice of many years standing. It also cures diforders of the spleen, the green sickness, cramp, the head-ach, and the king's evil.

Broughton water proceeds from a spring, in the road from Skipton in Yorkshire, to Coln in Lancashire, the village being in the mid-way between those two places. It is of a whitish colour, and colder than common water, as is observable in others of the sulphureous kind. A gallon contains four drams of sediment, the sourth part of which is earth, and the rest sea-salt and nitre. The virtues are much the same

as those of Harrogate water, but weaker.

Wigglefworth is a village in the West Riding, sour miles south of Settle, where there is a spring remarkable for yielding an alkaline nitrous sait. It is very black, and has a strong smell of sulphur, with a saltish taste, and lathers with Soap; but will not curdle Milk. Three gallons yield seven drams of sediment, of which six scruples and a half are black earth, and the rest salt. The country people drink sour or sive pints of this water as a vomit, and six or seven as a purge; but it seems strange that more should be required for the latter than the former.

Newton-dale is in the North Riding, 12 miles west by north of Whithy. The water here is cold and very astringent; and it petrifies every thing in its course, producing various and beautiful incrustations and figures. It effectually cures loosenesses and bleedings

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WATERS, EARTHS, FOSSILS, and MINERALS. 49

of every kind, both in men and beaft; and it quickly and wonderfully reftores weakened joints, that are even beginning to be difforted, by bathing therein.

Knaresborough is noted for a dropping Well, so called, and is a market-town in the West Riding. The water is very cold, extremely limpid and sweet, and it will let fall a white sediment with Oil of Tartar. It has a petrifying quality, and its particles consist chiesly of spar and some sulphur. A gallon of the water, that fell from the petrifying rock, yielded 185 grains of sediment, of which seven scruples and sour grains left sive scruples and four grains of earth, which would ferment with acids; and there were two scruples of salt, which shot into nitrous crystals. It cures inveterate sluxes of the belly, bloody sluxes, and the diabetes, as well as all preternatural discharges of blood; also colliquative sweats, as well as ulcers of the bowels, and hectick severs. Three half

pints are a dofe.

Searborough Water is the most noted in all Yorkshire, and was discovered about 160 years ago. It has been much used of late years, not only at the fountain head, but at distant places. The taste is bitterish and ferruginous; it curdles with Soap, and yields a large white grumous sediment with Oil of Tartar. A gallon yields about 284 grains of a reddish white colour, with a bitter, faltish and roughish tafte. It destroys the fourness of acids, ferments firongly therewith, and turns of a light green with Syrup of Violets. The proportion of earth to the faline parts is as 66 to 150. The water has been found good in hectick fevers, the rheumatism, scurvy, preternatural thirst, recent and partial inflammations, and diseases of the skin. It is also good in disorders of the stomach from intemperance, as well as in hypocondriack and hysterick disorders; in asthmas, in habitual costiveness, the heart-burn, and in all cases where purging is indicated. but a poll of and the best entired the a microficers, at a

re great from goods and treasure CHAP. III.

Of EARTHS and CLAYS.

HAT fort of Earth, which we call SOIL, proceeds from the putrefaction of animal and vegetable substances, and will burn in the fire and swim in the water. Linnaus has nine forts of these, whereof one does not properly belong to this class; the others are, the Marshy Soil interwoven with roots, and this is the same that we call Turf, which in many parts of England is used for such. The Vegetable Watry Soil is nothing elfe but Mud, and is to be met with every where in and about flanding waters. The Spungy Soil of heaths will ferment with fome fort of fluids, particularly acids. The Vegetable Soil of the Alp; is to be met with every where among those mountains, and is a little reddish, or rather of a blackish brown. The Vegetable Common Black Soil is met with in various places, particularly in meadows, fields, and pastures. The Vegetable Reddish Soil, partaking of Oker, is particularly found in West Gotbland. The Animal Soil of brute beafts may be met with in places where feveral of those animals have been laid in heaps, and have putrified and turned to Dult; that of human bodies may be feen in every church yard.

A CLAY is a heavy, thick, fat, tenacious, smooth Earth, which when held in the mouth becomes like foap or fuet; it is either foft or hard, in proportion to the quantity of Water that is mixed with it, for it readily dissolves in that sluid. When it is soft, it may eafily be shaped into any form; but, when it is baked in the fire, it turns into a stony substance. There are a prodigious number of different forts of Clay, and of

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different colours.

The Clay that is perfectly pure and white is of very fine texture, and when cut leaves a polished shining fubstance; when examined by a microscope, it appears to be of a close, even, regular texture, unless mixed with particles of a different kind. It will ferment pretty brifkly with Aqua Fortis, as will most other kinds

WATERS, EXETHS, FOSSILS, and MINERALS. 54

kinds; for Linneys makes it a characteristic of Clay. Whether we have here any of this fort is uncertain.

The CIMOLIAN EARTH of the shops is a fort of Fullers-earth, and is of a dull white colour, thou the furface is tolerably smooth. When burnt in the fire, it becomes very white and hard, and in a violent fire will turn to a dirty fort of Glass, It is to be met with in feveral parts of England, particularly at Wedensbury in Staffordsbire, where they use it for making tobacco pipes, as they do another fort, which is hard, heavy, and of a greyish white, which is said to be the best of all Tobacco-pipe Clays. Besides these, there are the White Tough Clay, the Smooth Gre White Clay, the Heavy Grey Clay, the Soft Grey Alkaline Clay, a Hard Grey Alkaline Clay, a Soft Ashcoloured Heavy Clay, and several other kinds, whose differences are not so considerable as to be particularly infifted upon. They are used for making tobaccopipes, Dutch tiles, and several forts of earthen ware.

The EARTH of MALTA, so called from the Island from whence it is brought, is a sort of Clay of a whitish ash colour, and is imported in small cakes, marked

with various characters.

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There are four forts of YELLOW CLAY, all which will ferment with Aqua Fortis; one of these is entirely yellow, another yellow with blue spots, the third is a sandy Clay, and consequently brittle, as well as the fourth, which is of a brownish yellow. They are all

of use for making some forts of earthen ware.

The Hard Brown Spotted CLAY is in some degree transparent, and is of a fine shining pale brown, variegated and spotted with deep black. It does not stain the hands when touched, and yet it adheres sirmly to the tongue, having a sort of an astringent taste, but without grittiness. This is what is usually called Lemnian Earth, or The True Sealed Earth, and is brought over in small cakes, weighing above four drams each, and marked with several characters. The island on which it is dug was formerly called Lemnos, but now Stalimens. The virtues of this Earth, or Clay, were formerly much celebrated, and it was given as an antidote against poisons. It was supposed to be of an alkaline supposed to be of an alkaline.

sull not ferment or effervesce with Aqua Fortis, nor indeed several others, notwithstanding what Linnaus has said to the contrary. When analysed, it is found to contain a small quantity of an urinous volatile Salt, a small matter of bituminous oil, and a little Salt like common Salt. It may be easily dissolved in Water, and has been given in some disorders; but it is now not used with us.

There are three ENGLISH CLAYS of the brown fort, as the Brown Heavy Tough Clay, with which they floor barns in some places, and in others make earthen vessels. The Dusky Bluish Brown Tough Clay, which when burnt in the fire turns to a red colour, and in a violent fire to a deep grass green; however, it is most useful for making of tiles. The Hard Pale Brown Clay is generally full of shining particles, and is of a rough kind; but being mixed with tougher Clay in Staffordspire, it serves to make strong vessels of several kinds.

The Blueish Brittle Soft CLAY has somewhat of the nature of Marl, and when dry it appears to be full of shining particles. It burns to a darker colour, and is used in several parts of England for making a very strong fort of earthen ware. The Tough Bluish-Clay has an even smooth shining surface, and when burnt in the fire becomes as hard as flone, and of a fine red colour. It is to be met with in Northamptonfoire, but at present is made no use of. The Hard Tough Pale Blue Clay is extremely heavy, and of a close, even texture; being burnt it turns to a pale yellow, but it will not well endure the fire. It is used to make gally-pots, and the like. The Light Soft Blue Clay is of a loofe texture, and burns to a pale reddiff brown; there are but small quantities found of it at a time, and therefore it cannot be supposed to be much in use in making any fort of veffels. The Hard Tough Whitish Blue Clay is supposed to be that with which they make China ware here in England when mixed with other things; however, this is not certain.

The Green Heavy Turf CLAY is a fine smooth compact Earth of a dull dusky green, and very heavy.

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It has hitherto been put to no use. The Pale Smooth Green Hard Clay is of a smooth, even, regular texture, very heavy, of a shining surface, and almost as hard as Stone. When a thin piece of it is held up to the light it is almost transparent; but in the fire it loses its green colour, and turns to a pale grey. It has been brought from Saxony in Germany.

VERDITER is a fort of bluish green hard Clay, and is usually dug out of the Earth in lumps of different fizes, that is, from half a pound to fix pounds and upwards. It is of a fine even gloffy furface, and very smooth to the touch : it does not colour the hand; but when it is drawn along a rough furface it leaves a dusky green line. When burnt it is of a dusky brown colour, being entirely diverted of its green or blue. It has been brought from feveral parts; but that from Italy is the best, and is much used by painters.

The ENGLISH VERDITER is got out of Mendip Hills in Somer let bire, and is a hard, heavy, firm earth, of a deep dusky green colour; when burnt it becomes as hard as stone, and of a very pale whitish brown colour. There is another Greyish Green Brittle Clay, that is met with in Mendip Hills, which burits and crackles in the fire, though the change of the colour is very fmall; but it acquires a confiderable hardness.

The Soft Pale Red CLAY is very clammy while foft, but when dry it is compact and hard, and of a very beautiful pale red, variegated with grey, at least fometimes. In the fire it grows as hard as stone, but the colour is much the same. It is brought to London from the Isle of Wight, and is faid to be of some use to the workers in mahogany wood. The Pale Brownift Red Smooth Clay has somewhat of a Brownish cast, and is commonly veined with Pale Blueith Grey Clay; it is confiderably heavy, and of a very close even texture. It crackles at first in the fire, but becomes pretty hard. In Staffordshire it is part of the composition of their finest earthen ware. The Dusky Brown Reddish Blue Clay is found in feveral parts of England, particularly in Staffordbire, where it is a principal ingredient in their fine earthen ware of or non wall as the 2d v diffelye in water. . . C C

The Light Brittle Black CLAY is more dry than the generality of this fort, and not quite to tough; but it is feldom met with except in small quantities at a time. In the fire it emits a pale blue flame, with a fulphureous fmell, and burns to a very deep red. It is common in many parts of England. The Tough Heavy Black Clay, while in the bed, is of a thining jet black, extremely heavy, and pretty moift, with a fine gloffy fmooth furface when cut with a spade; when dry, it becomes extremely heavy and compact, and will not diffolve easily in water. In the fire it becomes as hard as stone, and of a pale red colour; it was formerly unknown in England, but has been lately met with in Staffordhire and elsewhere. The Heavy Britthe Black Clay is very fine, heavy, and of a smooth compact texture. When burnt, it becomes perfectly white, for which reason in Northamptonshire it is used. 的地址的接種。時間不 for making tobacco pipes.

There are Sealed EARTHS in Germany, so called, because they are marked with particular seals; the principal of which are at Gran in Hungary, and Goldberg in Silesia. That of Gran is called the Marrow of Gold; it is of a yellow colour and fat, seeming to be of a soapy substance, and melting in the mouth. It is got out of the gold mines near Gran, and is under the eare of the magistrates, who have it made into round balls, and marked with the city seal. They suppose it to be impregnated with a golden Sulphur. The Goldberg Sealed Earth has the name of the Marrow of Silver, and is of a whitish grey colour. It is supposed to be derived from silver, from whence it has its name. It is not brought into medical practice in England.



CHAP. IV.

Of MARLS.

MARL is an earthy, brittle, light substance, between Clay and Chalk; for it is not so fost and fat as Clay, nor so hard as Chalk, nor will it very easily dissolve in water. WATERS, BARTES, FOSSILS, and MINERALS. 55

CIMOLIAN BARTH is heavy, but loose and apt tocrumble, for which reason, being thrown on the surface of the earth, it soon moulders away. It has not the least effervescence when put in water; for it only melts away, and turns to a fort of sizy liquor of a greyish colour. It is not at all affected with the oil of tartar, but spirit of salt poured on it causes it to ferment. It is pretty fat and soapy.

SAMIAN EARTH is very fine, pure, of a close equal texture, and yet remarkably light; when dry, it is of a fine bright white, with a smooth polished surface; it is very soft to the touch and adheres firmly to the tongue; when burnt in the fire it becomes of a snowy white, and is found in the Isle of Samos; but this, as well as the former, is not at present used in medicine.

The Samian ASTER is by some called Samian Earth, but it differs greatly from the former, it being of a loose texture, and will not cut into regular pieces, It is of a pale brownish white, and seems rough, dry, and dusty to the touch, but adheres firmly to the tongue. It turns to a pale ash colour in the fire, and is found

between clefts of stone in the Hand of Samos.

CHIAN EARTH is a dense compact substance, but of a soft texture, and easily broken in pieces. When dry it has an irregular surface of a pale grevish white, and seems to consist of numerous stakes. It is very sine and soft to the touch, adheres sirmly to the tongue, and melts freely in the mouth. Thrown into the water, it causes it to bubble with a hissing noise, and melts into a substance like cream; in the fire it becomes perfectly white, and is found in the island of Chia; but it is of no use in medicine.

CELENEUSIAN EARTH, by some called Mineral Agarick, is found in the perpendicular clefts of the strata of stone, in irregular masses of a sine pure white colour. It is spungy, brittle, whites the singers, and adheres sirmly to the tongue. When thrown into water, it sends up a great number of bubbles with a hissing noise, and turns it white. It comes to a snowy whiteness in the fire, and is sound in stone quarries

almost all the world over.

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The White Spungy Dense MARL is not fo white as the former, but is of a more dense texture. It is frequently found in the cavities of stones, and, if alone, generally near the surface of the earth. When it is dry, it becomes of an uneven compact texture, moderately heavy, and of a dull dead white. It bubbles in the water like the former, with a hiffing noise, and is found in many parts of England.

Hard Spungy Alkaline White MARL, called by some Native Lime, is a hard dry coarseish earth found in the clefts of stone, and sometimes lying loose upon, or immediately under them. It is of a dull whitish colour, with a small mixture of greyish brown, and is of a more firm texture than the former earths. It bubbles and hisses like the former, and will cement like Lime. It is found in some parts of England.

MELIAN EARTH, found in the island formerly called Melos now Milo in the Archipetago, is not unlike the Cimolian, and is made use of there for washing of

Photon and distribute

CRETAN EARTH, or CHALK, was fo called by the ancients, because it was found in the island of Crete, now Candia: but it is now to be met with in most parts of the world, and particularly in England, in very great plenty, where there are many large hills of it confitting of nothing elfe. It is an Alkaly, and therefore is given in acidities of the stomach, and the heartburn, when properly prepared; though fome take it as it is for that purpose without any preparation. It is likewife good in coughs that proceed from an acrid phlegm. It is commonly given from ten grains to a drachm, but there is no danger in taking larger dofes.

Blueish Chalk MARL when dry, after it is taken out of the earth, is of a hard texture, of a blueish colour, generally veined or spotted with red. It is very foft and smooth to the touch, and will not adhere to the tongue, at least very little. Burnt in the fire, it turns to a palish brown, streaked with dark red. It is found in some parts of England, and in some places ferves to manure land.

Blueish

Blueish Brown Brittle MARL is of a loose texture, and very light. It is soft to the touch, and adheres a little to the tongue, melting freely in the mouth, it being a pure sine earth. It is somewhat alkalious, and when burnt turns to a dirty reddish brown colour. It has sometimes a great many sea shells found in it, and is a good manure for land.

Stony Blueish MARL is the hardest of this class, and is of a rough compact texture, with an unequal surface. It bubbles in water, but will not ferment with aqua fortis, and in the fire turns to a dull dusky red. This and the former are found in several parts

of England.

Yellow Brittle Sandy MARL breaks into small pieces, when dug out of the earth, and when dry is of a brighter yellow than before it was dug up, which is the property of all colours; for a little water will turn them darker. It is spangled all over with small, flat, glittering particles, and is rough and dusty to the touch. When burnt in the fire, it turns to a fine deep red, and is a good manure for heavy stiff Clay lands.

Pale Red Brittle MARL is always found in the cavities of Stone, or in perpendicular clefts of the Earth, and has a fine, compact, close texture, with an even, fmooth, foft surface. It is common in Germany,

Italy, and France.

Red Brittle Heavy MARL is very common in England, and is a good manure for poor hungry land. It is of a crumbly texture, and commonly very dry; it becomes of a deeper red in the fire, and much harder.

Deep Dusky Red Sandy MARL is frequently found variegated with whitish, greyish, or bluish. Earths, and is of a loose crumbly texture. It melts very readily in the mouth, but leaves a great deal of harsh, sandy matter between the teeth; when burnt it becomes of a deeper red, but not much more hard, and is found in our North American Plantations.

Stony Red MARL is greatly valued by the farmers for making a good manure; for, though it is almost as hard as a stone when laid upon the surface of the

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earth, it will crumble to bits, which perhaps is owing to the rain, as it will break to pieces in about ten hours time in water. Fire makes little alteration in

it, and it is found in feveral parts of England.

RUDDLE, by fome called Red Oker, and by others Marking Stone, is a fort of Marl of a thin texture, and very brittle. It is of a red colour, and has a smooth foft surface. When burnt it becomes pretty hard, but does not change the colour. It is used in the country for marking of sheep, and by the painters for colouring of pales, window shutters, and the like. The best is faid to be brought from Derby-Bire.

Red Heavy Hard MARL is firmer and drier than the former, it being of a regular close texture, and composed of several thin plates lying close upon each other. In the fire it burns to a darker red, and grows much harder. It is used by the furriers to mark with.

Brown Brittle MARL is of a loofe texture, and eafily crumbles; but makes a very good manure. It is fometimes variegated with grey, and fometimes with black, and is a little dry and dufky to the touch. When burnt it becomes of a pale red, and fomewhat more hard. It is used to manure grafs land in Suffex.

Fullers EARTH is well known almost to every one, being commonly used for getting greafy spots out of cloaths. It is foft, and of a greyish colour; but fometimes paler, and fometimes of fo deep a colour as to be almost black; though it has always a greenish cast. It melts freely in the mouth, and for its softness and smoothness is sometimes called Soapy Earth.

Green Fullers EARTH is the most dense and compact of all kinds of Marl, and is of an even smooth texture, being extremely foft and oily to the touch. It melts freely in the mouth, and in the fire turns to a very pale brown. It is found in Germany, where it is used as common Fullers Earth.

Green Sandy Brittle MARL, though very heavy, is of a loofe texture, and eafily crumbles in pieces. It is found in many parts of England, and is used in

Suffex to manure clay lands.

WATERS, BARTHS, FOSSILS, and MINERALS. 50

Black Brittle MARL is of a loose texture, easily crumbles, and is very heavy; though it is of a brownish black, it does not stain the hands. It is found in Mendin Hills, in Somerfetfbire, above twenty feet deep in the earth.

C H A PAT V. 10

Of LOAMS or EARTHS found in Strata or Beds.

HE WHITISH LOAM is coarse, loofe, fost, and moift, while in the firatum; and though it is easily cut with a spade, it will not stick thereto. When dry it is of a loofe crumbly texture, confiderably heavy, hard, harth, and gritty to the touch. It does not at all flick to the hand, but will melt freely. in the mouth, and makes a flight histing noise when thrown into the water, where it almost immediately falls into a loofe powder. It is composed of a large coarse white sand, united to a greyish marly clay, and will burn to a pale brownish red. It is sometimes. mixed with fliff clays in making of bricks.

The Brownish White LOAM is of a fine even texture, and confifts of very fine white fand joined to a . pale brown clay. When it is cut with a spade it leaves an even furface, and when dry it is of a whitish brown colour, but very pale. It does not break very easily between the fingers, nor does it flick to the hands :: but it will melt in the mouth, though flowly, and makes . a violent effervescence with aqua fortis. It is used for making bricks mixed with clay, and then turns to a

pale red colour.

The Pale Yellow LOAM is of a fpungy texture, : and confilts of white fand united to a yellow clay. When it is cut with a spade, it leaves irregular masses, . with a rough uneven furface behind it, and when dry it is loofe and spungy, and seems mixed with a great number of shining particles. It is harsh and dry to the touch, and crumbles readily between the singers, , but does not stick to the hand. It makes an effervescence with aqua fortis, and turns red in the fire; but : it is never used alone for bricks.

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The Rough Yellow LOAM confifts of a coarse yellowish sand, joined to a pale yellow clay, which in a sew places is white. It is smooth when cut with a spade, and when dry is extremely hard. It makes no effervescence with aqua fortis; but when thrown into the water it makes a little hissing noise, and soon salls into a loose powder. It turns to a deep red in the fire, makes excellent bricks for building surnaces for melting iron, and even endures the fires of the glass-houses; it also makes fine lutes for chemical vessels. It is met with near Hedgerly, sive miles from Windsor, and bears a considerable price.

The Deep Dusky Yellow LOAM consists of a deep yellow and a whitish sand, with a very little clay, and is very harsh and coarse. It is most in the stratum, and when dried is of a loose texture, readily crumbling between the singers without sticking to the hands. It makes no effervescence with aqua fortis, nor does it his when thrown into water. It is used for making bricks

when mixed with good clay.

The Hard Brown LOAM confists of large white sand and deep brown clay; it is very hard, but not tough, though it cannot be got up without pick-axes: when dry it is very hard and heavy, and will not break between the singers. It will not his when thrown into water, nor make an effervescence with aqua fortis. It is often full of small sea-shells; and in Northampton-shire it is so full of them that they make sloors for harns therewith; it likewise serves to make roofs for ovens, and other purposes.

The Light Pale Brown LOAM is the lightest and most spungy of any of this kind, and is composed of fine pale yellow sand, mixed with light brown clay. When dry, it crumbles easily between the singers, and sticks a little to the hand. It will not effervesce with aqua fortis, but when thrown into water makes a little hissing, and al-

most immediately falls into a loose powder.

The Yellowish Brown LOAM consists of a white and yellow sand, together with a small quantity of sine brown clay. It is moist in the stratum, and when dry is of a loose crumbly texture, with a rough and somewhat dusty surface. It makes an effervescence with aqua fortis.

fortis, and hisses a little when thrown into water. This fort alone will make fine red bricks.

The Greyish White LOAM is composed of a fine white sand and a pale blueish clay, spangled with a great number of small plates of tale. While in the earth it is moist and soft, but when dry is very heavy and compact, with an even smooth surface; but it will not break between the singers, nor stick to the hands. It raises a great effervescence with aqua fortis, when thrown into water makes a slight hissing, and after a little time breaks into small lumps. When burnt it becomes very hard, is of an agreeable reddish colour, and will make good bricks when mixed with a proper clay.

The Pale Yellow LOAM is of a loofe fpungy texture, and confifts of small whitish fand with a pale yellow clay. It is pretty tough in the stratum, as well as moist; but when dry it becomes firm and hard, and is spangled with tale. It will not break readily between the singers, nor stick to the hands, nor yet make any effervelcence with aqua fortis; when thrown into water it makes a very little hissing, and soon falls into a loofe powder. It is proper for making fine red bricks.

The Yellowith Brown LOAM has a very loose texture, and is composed of yellowish fand with fine brown clay. It will not effervesce with aqua fortis, but it makes a very small hissing when thrown into water, where it moulders into powder after some time. Mixed with alhes it is greatly used near London for making bricks

The Reddish Brown LOAM consists of a hard whitish sand, and a reddish brown clay. It is pretty firm in the stratum, and when dry becomes very hard and heavy. It will not effervesce with aqua fortis, and it hisses but little when thrown into water, where it falls into powder after some time. This Loam serves for making bricks in many parts of England.

The Red Sandy LOAM confifts of fine pale yellow fand, and a bright red clay, mingled with fragments of a very red iron ore, and a great deal of reddiff dufky fpar. While it is moift it is quite loofe, and of a very deep red; but when dry it is of a pale red, and of a very loofe texture, for which reason it crumbles to

powder

powder between the fingers. It will efferveice with aqua fortis, and burns to a fine florid red. The land composed of it is very proper for rye, barley and peale.

The Brittle Brown Sandy LOAM is an earth partly fandy and partly ftony, and when dry will not keep together in a lump, the texture being to loofe and fpungy. It makes a brisk effervescence with aqua fortis, and hisses pretty much when thrown into water. Those lands that consist of this are accounted

poor and barren.

The Greyish Brown Sandy LOAM is composed of fmall white fand mixed with pebbles, and is full of cavities which are smooth and glossy at the bottom. is pretty tough and very heavy, and has a rough rugged appearance, without any dust on the surface. It does not readily crumble to powder, nor does it flain the hands. It makes little or no histing when thrown into water, nor does it effervesce with aqua fortis.

The Heavy Yellowish Brown Sandy LOAM is composed of a great number of different hard particles; a brown gritty stone, a yellow fand, pieces of spar, and a very glittering bright white fand, with a brownish fpungy earth. It is hard, heavy and somewhat tough, and in dry feafons breaks into very large maffes, tho' it is of a very brittle loofe texture. It is very duffy and hard when dry, and very flicky in wet featons, which renders the walking on it very flippery and troublesome. It makes a considerable effervescence with aqua fortis, and burns to a pale red with very little hardness. Some of these last are more properly called Moulds than Loams, though they are placed in the fame class.

CHAP. VI.

Of O K E R S. it assiss paiden

IGHT Brittle Pale Yellow OKER is between the colour of Brimstone and what is called a cream colour, and is of a loofe crumbly texture, it being composed of very thin fine plates. It is extremely light, and separates into flakes, in the fire, of a dull reddiff 21832033

eddish brown colour. It is found in Pennsylvania and Virginia, and with water makes a straw colour, but

with oil a pleasant yellow.

Hard Heavy Pale Yellow OKER is well known to the painters, and is of a close, compact, firm texture, with a smooth even surface; when burnt in the fire it turns of a dull pale red, and becomes considerably hard. It is found in several parts of Europe, and particularly in Somer sets bire.

Light Crumbly Yellow OKER is commonly feen at the mouths of the springs of the Spa kind, and at present is made very little use of; nor can it be expected in any large quantities. In the fire it turns to a

pretty good red.

Light Brittle Gold Coloured OKER is found in finall lumps in the earth, and is very light, being of a crumbly texture, and stains the hands of a true gold colour. It turns to a bright red in the fire, and becomes a little more hard. It is common among gravel in several parts of the kingdom, particularly on Mondip Hills, where it lies in the clefts of the strata. It is also in a gravel pit on the right hand of Oxford Road, about a mile from London. When burnt it turns to a red, and might probably be of use to the painters.

Light Plated Saffron Coloured OKER is fometimes found making a stratum, and sometimes in the perpendicular clefts of other strata, and is of a soft crumbly texture, with a rough and even surface, but colours the hands with a very beautiful yellow. It burns to a dusky red, and is common in Northamptonsbire and

Staffordfbire. 19 hatter and state to all the same

Common Yellow OKBR is a dense heavy earth, of a dull yellow colour. It ferments pretty much with aqua fortis, and burns to a pretty good red. It is

greatly used for house painting.

Hard Heavy Clayey Yellow OKER is very compact, and when dry is of a very fine bright yellow, with a smooth gloffy surface. It burns to a red, but crackles in the fire. It is found in Buckinghamshire and Tork-hire, and is sometimes used by the painters.

Stony Hard Heavy Yellow OKBR is in great plenty about Oxford, but it is so hard that it is not to be cut with a spade, and therefore they are forced to use pick

axes. It crackles a little in the fire, and turns to a

fine red. It is used by the painters.

Dull Dusky Yellow Clayey OKER is found in feveral parts of England, and is dense, compact, and heavy. It is of a dusky unpleasant colour, though it burns to a very fine pale red, and becomes almost as hard as stone.

Light Clayer OKER, of a brownish yellow, is sometimes found among other strata, and in their perpendicular clefts. The furface is smooth and glossy, and the texture very fine; it burns to a dead dufky brownish red. It is found in several parts of England, and

being of a good body is used by the painters.

NAPLES YELLOW is of a bright beautiful colour, between that of gold and faffron; but it is very loose, fpungy, brittle, and porous, and ferments pretty brifkly with agua fortis. When burnt it turns to a deeper yellow, and is found in Italy, particularly about Naples: It is generally effeemed a pretty good colour.

Brittle Heavy Red OKER is common in feveral parts of England, and is of great use among the painters. It crackles a little in the fire, where it becomes more hard, and of a paler colour. It is used by painters

for priming the coarfer fort of works.

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Brittle Purple OKER is common in Spain, of a very fine colour, and, though of a loofe texture, weighs very heavy. It is of a fine deep purple before it is dug up, and when dry it turns red. It is a firong Alkaly, and therefore ferments greatly with aqua fortis; in the

fire it turns to a paler colour.

INDIA RED is a very fine purple earth, of a firm, compact, and hard texture, it being heavy, and almost as hard as a stone. Before it is dug up it is of a blood colour, but when dry of a fine glowing red, and is full of bright glittering particles of a whitish colour. In the fire it burns to a greater hardness without much changing the colour. It is found in the Island of Ormus in the Gulph of Persia, from whence it is by some called the Persian Earth.

Bright Red Brittle OKER is found in Bengal in the East Indies, and though used in France is not much known in England. It is of a fine, bright, florid, red,

WATERS, BARTHS, Possits and MINERAL'S. 65)

and pretty heavy, though it crumbles between the fingers, and stains the hands. It ferments with aquafortis, but undergoes little alteration in the fire.

VENETIAN BOLE is a fort of an Oker, and is well known among painters, it being of a fine bright pale red, being pretty nearly of the colour of Red Lead. It grows harder when burnt, but the colour is worse. It

is brought hither from Venice.

Pale Red OKER is light, brittle, and of an alkalious nature, for it ferments very brifkly with aqua fortis. It fomewhat refembles the Venetian Oker, only it is brighter, and of a little paler colour. It is found in Florida, and is very probably in other parts of America, though it is not much known in England.

Pale Red Clay OKER is found in North America, and, though pretty heavy, is of a loofe, brittle texture. It is nearly of a flesh colour, and burns to a good red

in the fire. It is at present made no use of.

EARTH of Sinope is so called from a town of that name in Natolia, and is a fort of a Bole, sometimes of a deeper, and sometimes of a paler colour. It has been sometimes used in medicine, on account of its being of a drying nature, and particularly in sluxes of the belly.

Red CHALK is of a very dense compact substance, and is of a dull red colour. Some use it in the manner of crayons, or rather like black lead pencils. It is very well known to painters, and therefore needs no farther description. It is found in several parts of Eu-

rope, and particularly in Flanders.

Red Stony OKER is the hardest and driest of any of this kind, and is found in regular strata in the earth, but is so hard that it cannot be got up without pick axes. It is of a fine purplish red, and is very heavy, being mixed with fragments of Lead Ore, of a bright bluish colour; as also a small quantity of pure native Cinnabar. It burns to a fine red, and becomes more hard in the fire. The painters call it *Indian* Stone Red, it being brought from China; but it is very scarce.

Brown UMBER is a fort of Oker, and is greatly used by painters. It is found loose in small lumps among

among gravel, and fometimes in the perpendicular clefts of other strata. It is very light, though of a close compact texture, and burns to a deep brown in the fire. It is generally brought from abroad, there being very little of it in England, though it is thought to be

in Mendis Hills in Somerfetshire.

Couogn EARTH, commonly called Cullens Earth, is well known among the painters, and is of a dufky brown, with a close, compact, fine texture, but extremely light. It is not at all gritty, and has the tafte of oak bark. Being thrown into the water, it fwims on the furface till it is quite wet, and foon breaks into a very fine powder. It is easily set on fire, and never goes out till it is reduced to pale yellow aftes; from whence it appears to be of a vegetable nature, owing its origin to wood long buried in the earth. It is brought to us from the city of Gologn.

The ARMENIAN STONE is very opaque, and mixed with green, blue, and black spots, somewhat in the manner of Lapis Lazuli. It is of an even, regular texture, and the general colour is a beautiful blue. Some think it differs in nothing from Lapis Lazuli but in hardness, and is like that very scarce. It was formerly used in medicine as a purge and vomit, and the dofe was from fix grains to a scruple; but it is now out of use, except among the painters, for when it is prepared, it yields a fine blue colour, with

a greenish cast

Green OKER, or TINCAL, is of a denfe, compact fubstance, though of a coarse irregular texture, the furface being rough and uneven, and the colour of a pale green. It is found in many parts of Germany in and near the copper mines, and it partakes very evidently of copper. By burning it turns to a hard dufky brown Oker, and therefore is only used in its natural flate, it being reckoned a very good paint.

Heavy Brittle Black OKER is found in masses of different fizes, in the perpendicular clefts of stone. It is of a fine deep black, and of a compact, even, close texture, though it breaks very readily into small pieces between the fingers, and flightly stains the hands. It

is common about Mount Sorrel in Leicestersbire.

Black

WATERS, BARTHS, FOSSILS and MENERALS. 67

Black CHALK is found in broad flat pieces from wo to ten feet long in the earth, and from feur to wenty inches in breadth. It is moist and slaky when ust taken out of the ground, but soon becomes pretty hard, and very light. It will cleave very easily one way, and seems to be the offspring of wood buried in the earth; for it will burn, but not so long as Cologn Earth. It is much used in painting, and is to be met with in Spain, Italy, and Germany.

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CHAP. VII.

OF BOLES.

A BOLE is a heavy fat earth, which readily adheres to the tongue, and colours the fingers. It is of various kinds.

ARMENIAN BOLE, or Boile ARMENICE, is sometimes white and moderately heavy, being of a close compact texture, and having a very smooth surface. It is very scarce, and therefore being quite unknown to the shops it need not be insisted upon.

White Brittle BOLE is moderately heavy, with a fmooth furface, though it will crumble between the fingers. It will ferment with aqua fortis, and in the fire may be burnt to a fort of Lime. It is brought

from Germany.

Nocerian EARTH is very heavy, and of a greyish white, but not so brittle as some of this kind. It has no taste, nor does it ferment with aqua fortis. It is met with in Italy, and some think it good for the

bite of mad dogs, and in malignant fevers.

ERETRIAN EARTH is a fine kind of Bole of a greyish white colour, and pretty heavy, with a smooth surface, though it crumbles very easily between the fingers. It ferments very briskly with aqua fortis, and in the fire it turns perfectly white and as hard as stone. When a little wetted and drawn over a copper-plate, it will leave a line behind it, which in a short time

torns

turns blueish, R is dug up in Negropons, near the an-

tient Eretria, from whence it has its name.

Whitish ALKALINE BOLE is hard, of a close compact texture, and like other Boles melts gradually in the mouth. It ferments but flightly with agua fortis, but in the fire turns to a pure white. It is found in 200年。3基以

the East Indies.

The yellow ARMENIAN BOLE is of a faffron colour, and of an earthy, heavy, fat, brittle substance, with an aftringent tafte, it is of a close compact texture, with an extremely fmooth furface and very hard; but it melts on the tongue, though very flowly. It ferments briskly with aqua fortis, and in the fire becomes more hard, and of a deeper colour.

BOLE of Bloir is of a pale yellow, and of a compact texture, but very light, and readily crumbles between the fingers. It ferments violently with aqua fortis, and becomes almost as hard as stone in the fire,

turning to a much darker colour.

BOLE of Tokay is of a yellow colour and brittle, but very fine, and confiderably heavier than the former. It melts eafily in the mouth, and ferments violently with aqua fortis; in the fire it becomes confiderably hard, but does not change the colour.

SILESIAN SEALED EARTH is a fort of Bole which is pretty heavy, and of a compact texture, with a smooth furface. It turns to a kind of chocolate colour in the fire, and becomes confiderably hard; but is

a firanger to our shops.

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LIVONIAN EARTH is a very fine Bole, and very brittle; it is of a dull dusky yellow with a reddish cast, and its furface is smooth and glossy. It becomes of a harder texture and a darker colour in the fire, and is usually sealed with the figure of a church, an escutcheon, and two cross keys. It is not only found in Livenia, but in Spain and Portugal, wherewith they make a fort of earthen ware.

BOHEMIAN BOLE is of a deeper yellow than that of Tokay, it having a small mixture of red. The furface is very smooth and shining, and it melts readily in the mouth, at make the barries out to svery

Red

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WATERS, EARTHS, FOSSILS, and MINERALS. 69

Red BOLE ARMENICK is the hardest of all Boles, and is of a reddish yellow colour, not unlike that of saffron. It melts readily in the mouth, and has an astringent taste. That is the best which will most readily beat to powder with a pestile, or dissolve in water, without the least sandy sediment. Its virtues have been greatly cried up in various disorders; but it is now

feldom met with in the shops.

FRENCH BOLE is of an earthy substance, and of a pale yellowish red; it is heavy, brittle, and of an astringent taste. It ferments very slightly with aqua fortis, and in the fire becomes of a somewhat redder colour. It is often mixed with sand or small stones, and therefore it should be mixed with water before it is used, and poured off, after the grosser parts are sunk to the bottom. It is reckoned a good astringent, and is now used in the room of all other Boles, but seldom alone.

The Sealed BARTH of Striga is of a deep dull red, and has a tolerable smooth surface. It will crumble between the singers, and melts readily in the mouth. It ferments a little with aqua fortis, and becomes harder in the sire, without any change of colour.

Red Sealed EARTH of Livonia is confiderably heavy, though of a loose texture, and of a paler co-lour than the red Silesian Bole. It dissolves readily in water, and has a strong aftringent taste. The fire

makes little or no alteration in it.

Tuscan Shaled EARTH is a heavy pale red Bole, with a smooth surface, and easily breaks between the singers. It grows hard in the fire, and the colour becomes somewhat more dark. It is dug up near Florence, and is said to be good in loosenesses and excessive bleedings.

Portugal EARTH is a brittle, heavy, fine red Bole of a close texture, with a smooth shining surface. It becomes a little harder in the fire without change of colour, and is very common in the northern parts of

Portugal,

TURKY SEALED EARTH is of a greyish red colour, and of a looser texture than some other Boles.

The

The furface is foft and smooth, and it breaks easily between the fingers; in the fire it becomes confiderably hard, and of a dufky yellow colour. It is faid to be good in the plague, and to promote fweat. The hard pale red Bole is moderately heavy, and remarkably hard. It is of a beautiful pale red, or rather of a flesh colour, with a very smooth glossy surface. In the fire it becomes as hard as stone, and the colour acquires fomewhat of a blue. This is found in North America among our plantations.

Pale Brown Hard BOLE is very pure, of a compact texture, and moderately heavy. It confilts of thin plates laid closely upon each other, and has a smooth thining furface. It cracks and bursts in the fire, flying off in fmall flakes at first; but afterwards becomes confiderably hard, and of a pale red colour. It is met with in Germany, as well as in America, and in some

parts of England.

Pale Brown Heavy Denfe BOLE is very compact, and speckled with white and yellow. The surface is a little rough, but it may be polished by rubbing. It burns to a dufky red, but does not acquire a much greater hardness; it is found in many parts of Ger-

many.

Light Brittle Round BOLE is of a loofer texture than others of this kind, and is less weighty. It has a smooth equal surface, but readily crumbles between the fingers. It eafily diffolves in water, and is a little aftringent to the tafte. It becomes confiderably hard in the fire, and turns to a dark dusky red colour. It

is found in several parts of England.

Greenish BOLE is very fine and beautiful, and confiderably heavy. It is compact, and of a pale dufky greenish colour, with a smooth glossy surface. It has a brackish disagreeable taste, without any remarkable aftringency. It becomes confiderably hard in the fire, and turns to a dusky brownish red. It is found in the West of England.

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CHAR VIII.

OF TRIPOLIES.

SILVER CHALK of the ancients is of a fnow white, and its texture is fomewhat loofe and fpungy; for it is very light, and has a rough uneven furface. It easily breaks between the fingers, and has a taste like that of Pumice stone, but with no sandy grittiness. It grows hard in the sire without changing colour, and is found in Prussa, where it is used for cleaning and polishing silver vessels, from whence it has its name.

The Yellow TRIPOLI is of a firm texture, moderately heavy, and is only yellowish in the Earth; for when it is dry it becomes white, and almost as hard as stone. In the fire it turns to a beautiful pale red: it is found in several parts of Europe; but the greatest quantity is met with in Africa. It is called Tripoli from a city of that name in that part of the world. This and the former, as well as all of this kind, are composed of harder particles than Oker, for which reason they are of greater use in polishing metals.

Reddish White TRIPOLI never makes a stratum in the earth of itself, but is found in distinct masses among other strata. It is pretty hard, though of a loose texture, and consists of a multitude of plates or flakes lying upon each other. It is met with in Germany, and on Mendip Hills in England. It is used in polish-

ing brafs.

The Melian EARTH of Disserides is a hard, heavy, ash coloured Tripoli, and is of a loose, open, spungy texture, very readily falling into powder, it being very brittle. It consists of very harsh particles, and is extremely rough to the touch. It has a disagreeable styptic taste, somewhat like Alum; but the fire makes no great alteration in it. It is found in the islands of the Archipelago; but it is not much known in England, and consequently not used by workmen.

Light Brittle Greenith Red TRIPOLI is of a loofe fpungy texture, and remarkably light, with a rough uneven

uneven surface. It easily breaks between the singers, but does not colour the hands, and undergoes no alteration in the sire. It is found in several parts of

the world, as well as in Samerfetsbire.

ROTTEN STONE is a fort of Tripoli of a brown colour, and is very fost and light while in the earth; but out of it becomes more hard. Its texture is light and spungy, and it is dry, hard, and rough to the touch. It becomes a little more hard in the fire, and acquires a reddish cast. It is found in Derbysbire, Shropsbire, and Somersetsbire, and is of great use in polishing brass.

Hard Pale Brown TRIPOLI has sometimes a little cast of red, and is somewhat heavy, it being of a close compact texture, and almost as hard as stone; but it is more smooth than other Tripolies. In the fire it becomes more reddish. It is found in Wilesbire, and

ferves for the fame purpofes as the former.

Sparkling Brown TRIPOLI is the heaviest of this kind, though it is of a loose texture. It seems to abound with a fort of spangles that glitter pretty much, though the surface is rough and irregular. It ferments briskly with aqua fortis, and in the fire becomes of a fine red, and pretty hard. It is not very uncommon in England, but has never been put to any use.

Brownish Red Sparkling TRIPOLI is very light, it being of a looser texture than any of this tribe; but it is full of a great number of large glittering particles, and has a rough irregular surface. In the fire it undergoes little alteration. It is found in Wiltsbire, Sussex, and other parts of England. It is not fine enough to be used for any thing else but polishing Brass.

RREMARIAN MA

Of Ising-Glass, Moscovy-Glass, and Talc.

I SING-GLASS confifts of shining scaly particles, or slat plates, and that called Moscowy Glass is of the same nature; or rather, both these names are given to the same substances.

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White Shining ISING-GLASS is usually found in masses of a smooth and even surface, except at the edges; it is sometimes from eight to twelve inches broad, and from half an inch to three thick. It will cleave into innumerable thin plates or slakes, and is as transparent as the finest glass, instead of which it is used for putting before small prints generally designed for children, as also by some miniature painters for covering their pictures. They may be split, with care, so as not to be thicker than leaf gold, and yet still have a sort of springiness or elasticity, for which it is very remarkable. In the sire it becomes as white as silver, but then it ceases to be transparent. It is found in various parts of the world, particularly in Russia or Moscowy.

Bright Brown ISING-GLASS is not so beautiful as the former; but it has much the same texture, and, like that, will cleave into plates or flakes; but the surface is not quite so even. It is very bright, though not so transparent as the former, and is more subject to flaws and cracks. It soon becomes white and opaque in the sire, and then readily breaks to pieces, though it seems to be adorned with silver spangles. It is found in Germany; and, it is said, there have been small pieces of it met with in Eng-

land.

Bright Purple ISING-GLASS is as even and regular as the first kind, and may be cloven into as many stakes as that. While the stakes are pretty thick they are of a fine beautiful colour like an amethist; but when split into thinner plates it becomes paler, and in the thinnest of all, the colour is wholly lost. It also loses its colour and transparency in the fire, becoming entirely white. It is found in Moscowy and Persia, and by some it is called RED TALC.

TALC is a shining stone, and will split into very thin plates, which are transparent and a little slexible. It will not melt in the fire, nor will it admit calcination, nor lose its colour. It is of various kinds.

VENETIAN TALC is well known for the feveral attempts that have been made to reduce it into a fort of paint to beautify ladies faces. Linnaus calls it Vol. V.

Whitish Tale, confishing of plates almost transparent, which feel like fuet to the touch. The maffes of Venetian. Talc are from one to five or fix inches in diameter, with a very rude irregular furface, full of prominences and cavities. It is of very little use in medicine, it being employed only as a cosmetic to render the fkin more white and shining. The best way is to reduce it into an impalpable powder, the shortest way of doing which is to heat it red hot in the fire, and then quench it in cold water; this must be done several times, after which it may be ground upon a porphry into an exceeding fine powder thining like filver. This, when mixed with pomatum, is what the ladies call cold cream. The chemists have endeavoured to get the oil of Talc, but without success; though they Suppose it would turn brass into filver. If any thing of this kind has ever been procured, it has been owing to the additions, and not to the Talc itself.

Shining Black Talc, with finall leaves, is of an irregular complicated texture, like the former, and is found in maffes, which have a rugged furface, from one to four inches in diameter. They are composed of a prodigious number of irregular scales very closely but unevenly laid together, which will easily split into irregular flakes. None of the TALCS, nor yet the Ising-Glasses, can be made to firike fire with steel, for which reason they are called by Linnaus, Apyri, that is, without fire. They likewife remain unchanged in the fire, and cannot be diffolved by

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Shining Gold Coloured TALC, with small spangles, is called by some writers Mica aurea, from its thining like gold. It is found in small masses of a loose, irregular, brittle texture, with an uneven furface, but never exceeding an inch and a half in diameter. It is composed of a multitude of small flakes or spangles, with fometimes a mixture of a fort of crystal. These flakes are very small, being feldom above a quarter of an inch broad; but they are extremely smooth and foft to the touch. It is found in feveral parts of Europe, particularly in England.

Shining TALC, with the appearance of filver, has · fpangles

WATERS, EARTHS, FOSSILS and MINERALS, 75

fpangles of various fizes, is known to fome by the name of Glimmer or Cat-filver, and is very brittle. readily parting into flakes of which it confifts. The maffes are very finall, being feldom above the fifth part of an inch in length. It is found in feveral parts of Italy, as well as in England, and in some

places looks like thining fand.

Greenish Shining TALC, with very small spangles, is of a very pure kind, though it does not thine to much as the two former; but it is very brittle, and of an irregular shape, with a rough scaly surface. Its masses are found from one inch to eight of ten in diameter, which feem to be composed of very small spangles, which will readily stick to the fingers in handling. It is found in great plenty on the shores of Italy, and there has been fome found in England, on Mendip hills, but in no great quantity.

Greyish Green TALC, with small scales, is of a very dull colour, and has a diffant resemblance to the Venetian Tale, though the structure is very different. The flakes are of different fizes, but usually small. and lie in various directions, being of no determinate shape, and they are not so transparent as the other kinds. It is found on the shores of Yorkshire and

Lincolnsbire.

. ramidi adi mane Grey Shining TALC, with very thin scales, is rather brighter than any of the former kinds, and confifts of a valt number of plates or flakes, lying in a very confused and irregular manner, and of various fizes and shapes, the larger not being above half an inch in breadth. In the fire it turns as yellow as gold, and shines like it, it being the only Tale that changes in the fire. It is very common on the English there is although the last Cale I me me or day and

Bright Green Shining TALC, with broad spangles, is found in masses that are composed of others that are smaller, and these consist of very fine thin plates, which are generally wrinkled and turned feveral ways. The colour is very beautiful when unbroken; but, when the flakes are separated from each other, it is quite loft. It is confiderably heavy, and B. z mining loses lofes its greenness and transparency in the fire. It is

found in the beds of rivers in Italy.

Shining Greyish Yellow TALC, with small scales, makes a very splendid appearance, and is found in masses of eight or ten inches in diameter, which are composed of a great number of very broad, thin, light slakes. The surface is bright and glossy, but never even. In the sire it loses all its yellowness. It is found very frequently on the shores of Italy.

White Sweet-Scented TALC, with undulated scales, is by some authors called the Violet stone, on account of its smell. It is found in masses of a very compact and firm texture, though rough and irregular on the out-side; these are from an inch to twelve in diameter; they consist of a prodigious number of thin snow-white slakes adhering very closely to each other. These are of various sizes, without any regularity, and lie in all directions, being as soft to the touch as those of the Venetian Talc. In the sire it turns to a dusky brown red. It is common on the shores of Italy, and on the mountains of Germany.

Besides these, there are other TALCS not so easily cloven as the former, which consist of small plates in the form of spangles, and consequently are very dis-

tinct from the former.

The Shining Blueish Brown TALC is usually sound in masses of a pretty firm compact texture, with rugged unequal surfaces, and in the shape of pebble stones, from the size of a horse-bean to sive or six inches in diameter. It consists of small, but generally thick spangles cohering firmly to each other, and, though irregular, nearly of the same shape. They are very hard and harsh, feeling more like stone than common TALC, and consequently are hard to be separated from each other. They are very heavy, and yet will not strike fire with steel; but the fire will bring them to a pale redish grey without transparency.

Dull Pale Red TALC, with scales of various sizes, is usually found in masses from two to eight inches in breadth. It is composed of a vast number of scales that lie closely together in a very agreeable order; but

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they are mixed with an opaque substance of the same nature with the scales, only they are not of the same shape, nor well disposed: They seem to have very smooth and even surfaces, and are as smooth to the touch as Venetian Talc, to which they seem to have some distant relation. Though this Talc is considerably heavy, it will not strike fire with steel, but will turn in the fire to a pale whitish grey. It is very common on the shores of Lincolnsbire.

The East-Indians have a Heavy, Shining, Orange-Coloured TALC, which has a smaller number of plates than any of the other kinds. They have likewise another bright purple TALC, which is so clear and elegant, that it might not improperly be placed

among gems. aids to events as thorse or the saids

There are other TALCS that feem to be chiefly composed of fibres or filaments, and are, therefore,

by authors called fibrous Talcs.

ENGLISH TALC, fo called in the shops, is of a coarse, harsh, rough kind, with an unequal surface, and of a loose brittle texture. It is found in masses from one to eighteen inches broad, and feldom more than two inches thick. It has a rough, irregular, wrinkled furface, and confide of confiderably long coarse fibres, that run pretty regularly through the whole mais. It may be easily cloven according to the directions of the fibres, which, however, are so brittle that they feldom come off whole. It is of a dull, dead, whitish colour, and the filaments, when separated, appear a little gloffy. It will not ftrike fire with steel, but when calcined it turns to a perfect white. It is found in clay and marl pits, as well as among the strata of gravel, and the fistures of stone, and it will burn into a very good plaster, for which reason it is called the plaster stone; when burned it is used for cleaning filver lace. .

Glossy Yellowish White TALC, with broad straight sibres, is of a very close texture, and is found in thick flat masses of a very beautiful straw colour, but is seldom three inches over either way. It is composed of filaments that are perfectly straight, and may be very easily cloven; but the fibres cannot be divided

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fingly from each other, being so very brittle. It

ftone pits of Northamptonsbire.

Bright white TALC, with broad filaments, is of a loose brittle texture, and is found in large broad and pretty thick white masses, and where fresh broken it is very glossy and bright. The filaments are much broader at the top than at the bottom of the mass, it being above an inch upwards, and very even and glossy; they may be cloven very thin, but they will not bend, having no spring. It calcines in the fire to a white plaster, and is very plentiful in the alum

pits of Derbysbire.

Flesh-coloured Fibrous TALC, with narrow slaments, is not so bright as others of this class; but it is of a fine smooth close and compact texture. Its horizontal surfaces, formed by the ends of the sibres, are smooth and even, but not glossy. The masses are from three to twelve inches broad, and sometimes sive inches thick. It consists of single sibres, which ron throughout the whole length of the mass without interruption; but they are very brittle, though smooth and glossy. It will easily calcine in the fire, and will turn into very good plaster. It is chiefly found in Yorksbire.

Dull White TALC, with very sharp narrow silaments, is of a very compact firm texture, though it is only found like white veins in other substances, particularly red mark. The fibres are of various lengths, but they are all continued without interruption through the veins, and are from the breadth of a horse hair to half an inch. It will not easily cleave, and when it does, it is not perfectly straight, because the filaments

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run a little obliquely.

The Greenish White Glossy TALC, with straight narrow filaments, is of a perfectly even and regular texture, being very firm, compact and hard. It is found in broad thin masses of a fine glossy white, with a greenish cast, from two to sourteen inches broad, and to an inch and a half thick. When held up to a good light it is pretty transparent, and in the fire turns perfectly white.

CHAP. X.

Of Fossile Substances that are not elastick, and composed of short Fibres.

COME authors call these Lachnides, from Lachne,

a Greek word, fignifying hair or down.

The Flesh-coloured Pale Glossy LACHNIS, with short, broad, and crooked silaments, is found in very broad slat masses of a whitish slesh colour, which have a very smooth, even, and somewhat glossy surface at the top and bottom; some of them are eight or ten inches broad, and from one to sour thick; and they are composed of slat broad silaments, irregularly placed, and lying in oblique angles. These masses will cleave perpendicularly according to the direction of the silaments, though they adhere pretty closely together at their sides, and have very smooth glossy surfaces. They will neither serment with aqua fortis, nor strike sire with steel; but in the fire they will turn to a perfect whiteness. It is found in the marl pits of Derbysbire, but is of little use.

Greenish-White Glossy LACHNIS, with broad oblique filaments, is found in large, broad, thick masses,
with its horizontal surfaces very uneven, rough, and
rugged. It is sometimes seen near two seet broad,
and six or seven inches thick. It consists of pretty
bright glossy filaments that are very broad, but placed
in no regular order, nor continued through the whole
thickness of the mass, which separate it transversely
into several rows, separated by narrow veins of greenish
white marl. The whole mass is easily cloven and separated into transparent filaments that will not bend.
When in the fire it soon calcines to a white platter.

Dull Greyish White LACHNIS, with thick oblique silaments, is of an extremely compact and firm texture, and is found in very large, thick masses, from two to eighteen inches in diameter, and nearly as thick the other way. It is composed of eight or twelve rows of silaments, sometimes making angles with each other. It is not easily cloven, the silaments

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being so harsh and brittle, that they are separated with difficulty to any tolerable length. It is very heavy, and yet it will not strike are with steel, nor

will it very eafily calcine into plaster.

Dull White LACHNIS, with straight broad filaments, is of a pretty close texture, and extremely brittle. It is found in short thick masses, from two to six inches in breadth, and sometimes four inches thick. It is only composed of two rows of silaments that are pretty broad and very irregularly placed, meeting each other at the centre; they are so extremely brittle that they can never be cloven directly. It will turn to a very good plaster very soon in the sire, and

is found in the marl pits of Derbylbire,

The White Glossy LACHNIS, with broad oblique filaments, is of a very irregular texture, but very glossy. It is found in large flat masses, from two to ten inches broad, and from half an inch to above an inch thick. It consists of several rows of very broad glittering filaments, confusedly woven with each other at their ends, and they are all very short and broad, though bent and waved in different manners, making all forts of angles with each other. It is hard to be cloven, nor can the filaments be easily separated, they have so firm a consistence. They are soon turned by fire into a fine white plaster. It is very common in Yorksbire in the blue clay pits.

DULL Flesh-coloured LACHNIS, with broad, short filaments, is very brittle, and of a coarse, harsh, irregular structure. It is often found from eight to twelve inches broad, and six inches thick. It consists of broad, short, and very obliquely ranged silaments, divided into three or four beds, by the thick horizontal earth it is lodged in. The silaments are short and crooked, and adhere slightly to each other on the sides, which render the mass very brittle and easily cloven. It is easily burnt into plaster, and is found

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in the alabafter pits in Derbysbire.

The beautiful Flesh-coloured glossy LACHNIS, with slender filaments, interwoven with each other, is of a very short, sine, smooth, equal texture, and is extremely firm, compact, and hard. It is found in flat

WATERS, EARTHS, FOSSILS, and MINERALS, 81:

flat masses, from four to fix inches broad, and seldom above an inch thick. There are four or five rows of fibres that go to the making up less than an inch in thickness. It is difficult to cleave, the filaments being not easily separated from each other. It may be calcined very soon to a fine white plaster. It is found

in Somersetsbire and other places.

The Blueish-White LACHNIS, with very narrow straight fibres, is of a fine smooth texture, and pretty compact; it is found in flat masses from ten to sourteen inches in breadth, though seldom above an inch thick. It is composed of three or sour rows of orders or silaments standing perpendicularly on each other; these silaments being straight render the mass easy to be cloven or split, and they have pretty smooth glossy substances. They soon calcine to a very white plaster. It is found in the marl pits of Staffordsbire.

The Gloffy Greenish-Grey LACHNIS, with broad and very thin filaments, is found in masses four or five feet in breadth, being seldom above four or five inches thick. They consist of two rows or orders of filaments that are interwoven with each other at their internal ends; but they are always bent, and often placed obliquely. It will calcine, though but slowly,

to a very white plaster.

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The Glossy Greenish-White LACHNIS, with narrow bent filaments, is found in masses frequently as thick as broad, being sometimes no more than an inch in diameter, and at other times twelve inches. It is composed of many rows of interrupted filaments, variously bending and intersecting each other, which have very smooth unequal surfaces; though they are very hard and heavy, they will not strike fire with steel, and they calcine very slowly in the fire. It is found in the marl pits of Derbysbire. All these Lachnides may be accounted a fort of Talc, or at least akin thereto.

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Of Fossies, called Aspestos and Amianthus.

MOST authors that have treated upon fossils make Asbestos and Amianthus to mean the same thing; that is, what some call Earth-slax, and others Plumous Alum; but this last name has been very improperly applied: for the Plumous Alum is a real salt, which is found in an island in the Archipelago, called Melo. However, Linnaus makes a distinction between Asbestos and Amianthus; for he would have the latter to consist of longitudinal fibres, and the for-

mer of those that are interwoven.

Incombustible flax is a fort of Amianthus, and confifts of flexible fibres, like thread, lying parallel to each other, and eafily separated. The ancients spun these fibres, and made a fort of cloth thereof, in which they wrapped up the dead bodies they intended to burn, that they might preserve the ashes; for, when the body was burnt, the cloth remained entire. The Germans call it mountain flax; and it is found in Lapland, Siberia, and in the vallies of the Pyrenean mountains; but the largest quantity is brought to us from Negropont. When handled it causes an itching in the fkin, and sometimes blisters, which is owing to the fibres or down, of which it is compoled, getting into the skin; however, it is easily cured, by rubbing the part with oil, which will foon blunt the points of the down.

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There is another Amianthus, with angular, rigid, and opaque fibres, which some call Asbestos, with hard parallel fibres, not to be separated from each other. These are of an ash colour, and the whole has pretty much the appearance of wood. It is sound in Lapland, Sablberg, and other places. There is another Amianthus, consisting of stiff sibres that are easily separated from each other; but they are as brittle and transparent as glass, and of a greenish colour. A fourth sort is known in the shops by the name of Plumous Alum, and consists of exceeding brittle parallel

WATERS, EARTHS, FORSILS and MINERALS. 82 rallel fibres, that can hardly be separated from each other. It is found in Sweden.

Linneus has also three forts of Asbestos; namely. that which is heavy, and confifts of hard fibres, formed into a fort of flakes or plates, its will readily cleave, and is of a pale colour; but is to heavy it will not fwim in water. The Swedes call it mountain flax. Another Afbestos is membraneous; that is, it confifts of fibres fo interwoven, that it resembles old leather. It will fwim upon water, and the furface of it is hard, smooth, light and white. The third fort confifts of flexible fibres that crofs each other irregularly, and is to light that it is called by the Saveder mountain-cork; indeed, it looks like the inward bark of cork, and is fo porous a stone that it will fwim in water.

Other authors have the Greenish Asbestos, which is extremely smooth, firm, compact, and exceeding soft: to the touch. It is found in the form of veins in a fort of marble, and its filaments are flender and bent. It is met with in the ifle of Anglesea, and other parts. of Wales, in lumps, feldom larger than a nut and

Whitish-Brown Silky ASBESTOS is called in America petrified wood, its texture being even, regular and close. It is extremely foft and filky to the touch, and of a whitish-brown colour. It confists of long continued flat filaments, and is found from one to three inches long.

Grevish Silky ASBESTOS, with very long continued and roundish sibres, which run in straight lines the length of the whole mass, is found in lumps. from two to nine inches long, and the fibres are foplaced as to make it look like a piece of wood. It is found in the Highlands of Scotland.

Greyish-green Silky ASBESTOS, with long contimued and very flender fibres, is found in the ifte of Cyprus, in bits not exceeding a quarter of an ounce in weight, though sometimes three inches long, and

half an inch broad.

White, Loofe, Thready ASBESTOS, with broad fibres, is found in length from two inches to twelve; and fometimes the fibres feem to be bundled up like: the E.6.

the threads of cotton in the wicks of lamps. This is

found in the Highlands of Scotland.

Soft, Reddish-Black AMIANTHUS, with short, abrupt silaments, is found in the strata of iron ore, sometimes forming veins of an inch in diameter, but seldom so large. In the sire it turns to a very pale red. It is common in Germany among iron mines.

Greyish-green, rigid AMIANTHUS, with short, abrupt, and interwoven sibres, is said to be the Plumous Alum of the shops; though Linnaus affirms it

is an Asbestos.



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Of the Fossils called GYPSUMS.

AUTHORS are not well agreed what Gypsum properly signifies; for some would have it to be the lime of alabaster, others a sort of plumous alum, others Ising-glass, and others again the lime of the stone called Selenites; but it is more generally taken for the lime of certain whitish stones, which when burnt, contain some shining particles like Talc, and which are required to be but a short time in the fire before they turn to lime. But the Gypsum that is meant here includes those sort of sossils that are composed of small flat particles, which are ranged irregularly, and give the whole masses somewhat of the appearance of softer marble, they being bright, glossy, and in some degree transparent. They will very easily turn to lime in the fire.

Hard white GYPSUM, or plaster of Paris stone, has somewhat the appearance of loaf sugar, it being pretty sine, and of a very close, sirm, compact texture. It is sound in masses from sour inches to sour seet in diameter, and, when broken, shines like crystal. In the sire it readily turns to a very sine plaster,

It is chiefly found in France.

Hard Shining red and white GYPSUM, that has the appearance of marble, is found in masses four or WATERS, EARTHS, FOSSILS and MINERALS. 85

five feet in breadth, and three in thickness, with a rough, dusky, dark surface; but when broken it is bright and glossy. It does not turn into plaster, when calcined, so soon as the former. It is common in Yorksbire and Derbysbire.

Hard Greyish-white GYPSUM is found in masses about six or seven inches broad, and three thick, with a very rough, rugged, uneven surface, and a coarse, dull, dead look; when broken it does not sparkle like the other kinds. It is common in Germany

and Derby bire.

Soft, Shining, Green GYPSUM is found in lumps four inches broad, and more than one thick. It is of a very dull, dufky, brownish colour on the outside, but when broken is very glossy, though it seems to be a little spungy. It is very fost and brittle, and loses its fine colour before it is quite calcined in the fire. It is found on the shores of rivers in the East-Indies.

Soft White GYPSUM, commonly called Derbyshire plaster stone, is found in lumps from the size of an egg to two or three seet in diameter, which are opaque, and of a dusky brownish-white; but, when broken, pretty bright and glossy. It is of so soft and brittle a texture, that it will break with a small force. It becomes very white when calcined, and makes a very valuable plaster. It is found in many parts of Derbysbire.

Soft, Pale-brown, Glossy GYPSUM, is generally found in thin masses, seldom above a foot broad, and three inches thick, with a rough unequal surface; but, when broken, it has the appearance of marble, being extremely bright and glossy, and composed of very large broad particles. It is very soft and brittle, as most of this kind are, and readily calcines into a pure white plaster. It is found in some parts of Ger-

many as well as in Derbysbire.

Soft Red GYPSUM is sometimes met with in small lumps, not much bigger than a walnut, at other times in masses of ten pounds weight, with a very rough, dull, unequal surface; when broken, it sparkles, but not very much. The texture seems to consist of different rows of short lines or streaks, variously inter-

fecting

fecting each other. It is very brittle, and calcines very easily in the fire, making an excellent plaster. None of these Gypsums will ferment with aqua fortis, or strike fire with steel.

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The state of the A.P. XIII.

Of the SELENITES.

THE Selenites are stones consisting of slender fibres, ranged in fine even stakes of different forms, according to their kinds. They will cleave like Tale, not only horizontally but perpendicularly; and though they will bend a little, they have no spring. They will not ferment with aqua fortis, nor readily calcine in the fire.

The Thin, Fine, Transparent SELENITE, with transverse streaks, is a common fort, and is met with from one tenth of an inch to five or fix inches long. It consists of fine thin plates irregularly disposed through the whole breadth of the mass. These plates or slakes easily separate from each other in an horizontal direction, being almost as apt to cleave as Talc. It is pretty soft, and as void of colour as crystal; in the fire it turns to a pure opaque white. It is found in the strata of clay in several parts of England.

The Thin, Dull, Opaque, Slender, Streaked SE-LENITE, is found from half an inch to three inches in length, and confifts of a great number of even flat plates or flakes, each of which is of the same fize as the horizontal furface. It is formed pretty much like the former, but not quite so regular, nor is the ap-

pearance fo beautiful.

The Thin, Fine, Streaked SELEMITE, with longitudinal streaks, is seldom broader than an inch, and above a seventh of an inch thick. It consists, like the former, of parallel horizontal plates; but the fibres of which they consist, are slender, straight and exceeding regular, running in an oblique longitudinal direction, from one end of the stone to the other. It

cleaves;

cleaves very eafily, parting into flakes like Tale, and readily calcines to a fine white in the fire. It is found in the clay pit at Richmond, but at a confiderable debthings of STIMELISCHE Committee Tongson Salling

The Thick SELENITE, with transverse streaks and a rough furface, is blually met with of the fize of about an inch and a half in breadth, and the plates or flakes, of which it confifts, are remarkable for the largeness of the fibres that compose them, as well as the regular order in which they are laid. It calcines in the fire to a perfect whiteness, and is common in Grenery, and the orders

Yorksbire and Leicestersbire.

The Short SELENITE, with thick plates, is of various fizes, but the most common is two inches in diameter. It confifts of a fmaller number of plates than others of this kind, because they are confiderably thick, and are composed of bundles of fibres running longitudinally, and they are interfected with four or five transverse freaks. The whole stone is pretty bright and transparent. In the fire it turns to an opaque white, and is very common in the clay pits of Northamptonsbire. The will be and the second second second

The Transparent SELENITE, with narrow transverse fireaks, is generally between two and three inches long, and confits of very numerous horizontal plates, irregularly disposed, and of different thickneffes. They are composed of fine parallel straight fibres, running obliquely across the stone from fideto fide. It very early cleaves into very fine flakes. and calcines in the fire to the whiteness of snow.

The Thick, Dull SELENITE, with very fine transverse fibres, is generally about two inches long, and confifts of fine thin plates, evenly disposed, without the mass; these are made of exceeding fine slender filaments, running transversely in an oblique directionthrough the flone. The plates do not separate very eafily, and the whole mais is dulky, being very little. transparent. It is found in the clay pits in most parts. of England. The state state leave of the to leave more to

The SELENITE, with fine longitudinal filaments, is composed, as well as the two former, of two horizontal, and two oblique planes. It is of various

fizes, from a quarter of an inch to three inches in length. It calcines in the fire to a fnow white fub-

stance, and is very common all over England.

The Brown Transparent SELENITE is generally three inches long, and confifts of a great number of fine, transparent, firm, parallel plates, joining exactly to each other. The plates confift of many fine filaments, all ranged in the same order, and not collected into feparate bundles. It may be very readily cloven into horizontal plates that are very thin, and it calcines to a fine white in the fire. It is common in Continue and Line william Germany.

The Thin Transparent SELENITE, with transverse fibres, is commonly about an inch long, and confifts of many thin horizontal plates or flakes, made up of parallel fibres running obliquely across. It cleaves very easily, both horizontally and perpendicularly, and readily calcines into a white mais. It is common in Northamptonshire, and other parts of Eng-

land.

mentally aparts on the relative The Dull, Thick SELENITE, with very thin transverse fibres, is generally between two and three inches long, and is composed of many extremely thin plates, that confift of an infinite number of parallel fibres that are connected into bundles, and run transversely in an oblique direction. It is very brittle, but it eafily cleaves, according to the horizontal direction; and though it is as bright as the reft, it is not fo transparent; but it calcines more readily to a perfect whiteness. It is found in Leicestersbire in the yellow clay pits.

The Long Scaly SELENFTE is commonly about three inches long, and has its horizontal plains very rough and scaly, it being composed of a vast number of oblong narrow plates, falling very irregularly one over another; it turns in the fire to a pure white.

The SELENITE, with thin flakes and transverse filaments, is generally about an inch in length, and is composed of fix planes that are nearly equal; that is, a top, a bottom, and four fides. It is confiderably long, in proportion to its thickness, and is composed of parallel plates lying evenly over each other WATERS, EARTHS, Fossils and MINERALS. 89

in an horizontal direction, each making one whole furface of the stone. These consist of very sine slender sibres, laid obliquely across the slakes. It may be cloven very easily, according to the direction of the slakes; and in the fire it turns soon into a very pure white. It is sometimes found in Northamptonsbire.

The Dull SELENITE, with thick plates and longitudinal fibres, is exactly of the fame shape as the former, and is usually about two inches long, and a little more than a quarter of an inch in diameter. It is of an opaque whitish colour; but calcines very slowly to a fine white. It is common in clayey

grounds in Yorksbire, lying near the surface.

The SELENITE, in the shape of a column, with very fine sibres, has fix angles, and looks as if there was a part broken off at each end. There is no distinction of top and bottom, and all the planes are nearly alike. It is usually about an inch and a half long, and half an inch in diameter, consisting of a great number of very bright, and sine parallel silaments. It will cleave every way, but not into slakes, and the silaments are very slexible, but not elastick. It turns in the fire to a very pure white, and is found, but not commonly, in the clay pits of Northampton-shire.

The SELENITE, shaped like a column, with thick sibres, may be easily separated into silaments, for they will split off from many of its surfaces; but they will not bend readily, for they will easily break. They are neither bright nor transparent, but of a chalky whiteness, and turn to a pure white in the fire.

It is found in the cliffs in the ifle of Sheppy.

The Colourless Transparent SELENITE is of no regular shape, it being found in thin slat masses of different sizes and forms, that is, from one inch to a foot in length. It is composed of a vast number of minute and thin parallel slakes, not unlike Ising-glass. They are formed of a multitude of parallel shares, ranged in a beautiful order. They are extremely bright and transparent, and the substance is very soft. It turns in the fire to sine pure white. It is found in several counties in England.

There

There is another SELENITE of this kind that is whitish and dull, but not so pure as the former; but it seems to be made up of plain even slakes, like those of Ising-glass. It is commonly long, in proportion to its breadth, but is a little thicker than the former. The sides are uneven and ridged, like the tiling of a house; and it is of various sizes, being from one inch to six or eight long. It calcines slowly, but at length attains a perfect whiteness. It is common in Germany, and is sometimes met with in the strata of clay in Northamptonshire and Leicestershire.

The SELENITE, with eight fides, is always short and thick in proportion to its breadth, and is from one fixth of an inch to two inches long; but when it is only an inch, which is the common fize, it is about half an inch thick and broad. It is composed of a vast number of pretty thin plates, laid evenly and regularly in a transverse order, and these consist of moderately large fibres. The slakes are very slexible, but not elastick, and they are all opaque and whitish while together. It is found in the clay pits of

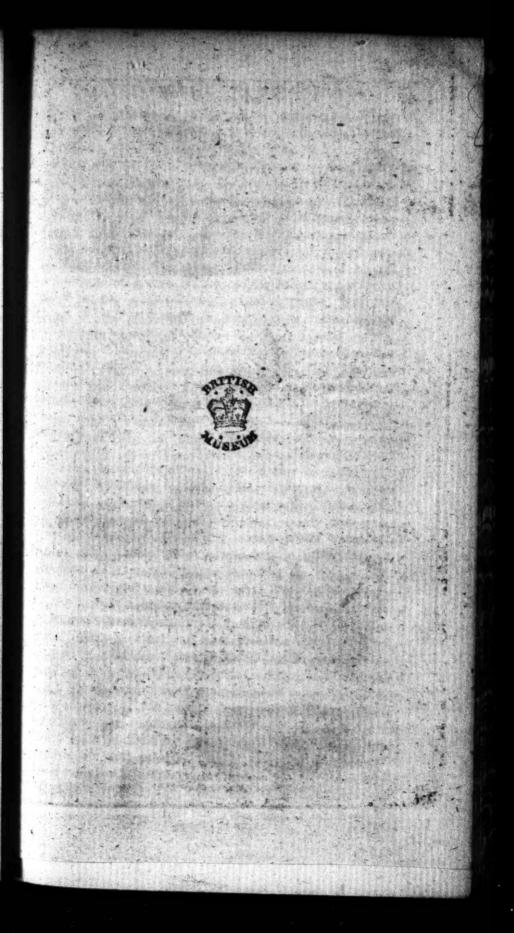
Stafford hire.

The SELENITE, composed of filaments that are ranged toward the surface of the body, into broader plates, which are notched at the edges, and feem to be radiated in the form of a ftar, is bright, and of a brownish white, and feems to be composed of fine thin plates, propagated from a fingle point, which is feldom placed in the centre of the mass, and the whole varioully jagged. The stars are usually broad and flat, having but little thickness in proportion to their extent, This stone is of various fizes, namely, from that of a barley-corn to two inches in diameter. When broken it feems to be composed of straight, even, and very fine flender longitudinal fibres, proceeding from the center, and form a mais of a very beautiful streaked texture. In the fire it turns perfectly white, and is found in the ille of Sheppy.

There are other species of the Selenite; but those

transportation

we have already mentioned are fully sufficient.



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RYSTAL is a fost transparent gem, that has sometimes like an hexagon column pointed at each end; or rather seems to be composed of two hexagon pyramids with a column placed between them.

It is the fostest of all gems, and when it is coloured goes by another name, though it ought not to be substituted in the room of the more precious forts of stones. When it imitates a Beryl, it is called a ba-

fard Topazy and the like wis ar amuloo mod year a

Crystals, with a long intermediate column, are, the very bright CRYSTAL without any colout, which seems to be the most perfect kind, and is generally free from all kinds of blemish. It is pointed, as mentioned above, and consequently consists of fixteen planes or sides in all; but those on the pyramids are not of an equal breadth, two of them being narrower than the rest. It is found from the size of a barley-corn to three inches long, but the common size is an inch. It does not depend upon any other body; but where one is met with, there are generally more. It is moderately heavy, will strike size with steel, and when calcined, is of an opaque white. It is commonly met with in the mountains of Germany, but is very rare in England.

Blackish Bright CRYSTAL, with short pyramids, is always pure and without clouds. It is of various sizes, and is most commonly three quarters of an inch in length. The number of sides is the saine as in the former. It is harder than common Crystal, and cannot be broken without difficulty. It is remarkably bright and transparent, and has what they call a black water. It is very uncommon, though it is sometimes sound

among other forts in some parts of Italy.

Dull Whitish CRYSTAL, with irregular pyramids, has a longish and pretty thick column, and the pyramids are longer in some parts than in others. It is seldom quite an inch long, and is near half an inch in diameter. It will strike fire with steel, and calcines easily

eafily into a pure white. It is common in Germany, and is fometimes found in Yorksbire and Cornwall.

British colourless CRYSTAL, with long pyramids, and a short column, is very bright and transparent, and the thick short column has long pyramids tapering at the end. It is usually about an inch and a half long, and three quarters of an inch thick. The planes are feldom regular, but four on the column and pyramid are frequently broader than the other two. It is fo hard as not to be scratched, and is not easily broken: When calcined, which it is with difficulty, it is as white as fnow. It is found in Bobemia.

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Bright Brown CRYSTAL, with short pyramids, and a very short column, is always thicker than it is long, and is feldom or never either cloudy or foul; it is of various lengths, from the third part of an inch to three inches, and the diameter is always greater than the length. It is generally found in large parcels in the fame place, and is extremely hard, breaking with difficulty, and in any direction; when calcined, it becomes

perfectly white:

Yellow Bright CRYSTAL, with regular pyramids, and a short column, is feldom pure, there being cloudy spots, films and streaks therein; it is composed of eighteen fides or planes, like the reft; that is, fix on each pyramid, and fix on the column, and is found from a quarter of an inch to two inches in length. It is confiderably hard, strikes fire with steel, and when calcined is entirely white. It is common in Silefia and Bohemia, and has been sometimes found in Yorkfoire.

Bright Colourless CRYSTAL, with a short column gibbous in the middle, is a very fine fort, and has moderately long and sharp pyramids at the end; it is three quarters of an inch long, and a quarter and a half in diameter, and is found fingle, though sometimes it is met with among the strata of stones. It is very hard, strikes fire with steel, and calcines to the whiteness of

example directal Dull CRYSTAL, with large pyramids, and an extreamly short depressed column, is a very foul opaque fort, and of a coarse texture, with a continual cloud cloud throughout its whole substance. It almost entirely consists of pyramids without a column, and is found detached from all other bodies, but commonly in considerable numbers. It is not so hard as common Crystal, but will strike fire with steel, though not easily; and is very white when calcined. It is seldom or never found in England.

Small, Bright, Blackish CRYSTAL, with regular pyramids, is extreamly clear and regularly formed; it is of various sizes, the largest among them not exceeding a fixth of an inch in length, but many are extremely small. It is very hard, and is calcined with difficulty. It is found in Germany in the cavities of a

black fiffile stone.

White CRYSTAL, confishing only of two pyramids, which are short, and joined base to base, is generally very pure, and is always found independent of all other bodies. It is not perfectly colourless, it being a little whitish; but it strikes fire with steel very

freely, and calcines very flowly.

Brown CRYSTAL, confishing of two long pyramids, without a column, is perfectly pure, and regularly formed, and is of different fizes, from the eighth of an inch to three inches in length, and one third of its length in diameter. It is feldom found fingle, many of them being usually joined together in an irregular manner; and, when not joined, they are always pretty numerous. It is of a very fine water, and extreamly hard, striking fire with steel, and calcining slowly to a perfect whiteness. It is found in Scotland on the sides of hills, and sometimes on the banks of rivers.

Crooked or Slanting CRYSTAL, confisting of two pyramids, without a column, is perfectly pure and transparent, and confists of an oblique, or slanting double pointed body, besides the pyramids being irregular. It is from a quarter of an inch to two inches long, and about three fourths of its length in diameter. It is of a very fine water, and is extreamly hard, striking fire readily with steel. It is found in the East and West-Indies, and is common in New Spain, where it is highly valued.

Bright

Bright Blackish CRYSTAL, consisting of two very short pyramids, without a column, is a very sine fort, and appears as bright as any stone of this kind. The two pyramids join evenly base to base, though sometimes one is a little larger than the other. It is commonly found in lumps, confishing of several of these Crystals pretty close together; however, at other times, they are loose and independent of each other. It has a fine blackish hue, and is very bright, with a fine water. It is extreamly hard, strikes sire with steel, and after a long calcination becomes white. It is found in Italy, Germany and France.

CRYSTAL, confifting of two pyramids only, with eight fides each, that is, having fixteen planes in all, and of a brownish colour, is of a very uncommon kind; it is fine and clear, though often spotted with large blotches of black. The pyramids are much of the same length, and the planes are extreamly smooth; sometimes a hundred, or upwards, are sound together, but detached from each other. It is considerably hard, strikes sire with steel, and calcines to a pure white. It is found in Virginia, on the sides of hills, among a

fort of iron ore.

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CRYSTAL without colour, confifting of two longish pyramids, with eight fides each, is a very pure fort, and very fine and clear; it is usually near an inch long, and a third of an inch in diameter, with the planes entirely smooth polished and even. It is usually found single, is very transparent, and of a very fine water, as well as extreamly hard. It is exceedingly scarce, and, as yet, has been found only at Gosslear in Saxony.

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CHAP. XV.

Of Imperfect CRYSTALS.

S PRIG CRYSTAL is whitish and transparents and has only one pyramid with fix angles, be-fides the column; it is an exceeding common fort, and is very regularly formed, though it is subject to vari-

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WATERS, EARTHS, FOSSILS and MINERALS. 95

flender, and fixed at one end to fome folid Fosfil, consequently the hexangular pyramid must be at the other end. The length is from a tenth of an inch to ten inches and longer; the planes are irregular, as to length and breadth, and they differ so much from each other, that scarce any two of these Crystals are found exactly alike. They are, almost always, found in clusters, are very hard, strike fire with steel, and cal-

cine, after some time, to a pure white.

Bright imperfect CRYSTAL, without a tinge of any colour, is, by many, confounded with the former; but it is different from it, and is often fold by dealers for a white sapphire, because it is somewhat like it; it is persectly clear, generally pretty regular, and has a long stender column with six angles, terminated by a pretty long hexangular pyramid; it is from one tenth of an inch to three or four inches long; but it is most commonly about an inch and a half. It is not found in such large clusters as the former, but is extreamly hard, strikes fire with steel, and calcines very slowly to a pure white. It is found in the East and West-Indies, as well as in Germany; sometimes it is so tinged as to imitate gems, and may be readily mistaken for them.

Dull Whitish impersect CRYSTAL, with a very short pyramid, is remarkably coarse and impure, not with having silms or clouds, but by being whitish throughout its whole substance; it consists of the same planes as the former, and is usually long in proportion to its thickness in the column; but the pyramid is always short. It is met with from a quarter of an inch to sour inches long, and is generally sound in large clusters; but it is not so hard as most of the rest; for it will not readily strike fire with steel, and yet it calcines slowly to a pure white. It is found in most parts of Europe, and particularly in Cornwal.

Bright Brown imperfect CRYSTAL, with a long pyramid, is generally known by the name of brown Crystal, and has a very fine clear texture. The form is generally regular, it having a long and pretty thick column, and is found from the size of an inch to an

inch

inch and a half in length, though some have been met with ten inches long. It is extreamly hard, strikes fire with steel, and calcines, at length, to a pure white. It is found in the East and West-Indies, as also in Silesia and Bohemia, as well as in the islands of Scotland.

Dull Brown imperfect CRYSTAL, with a short pyramid, is sometimes mistaken for the former, though it is not near so good, it having a dull and dead aspect. The column is regular, but always slender in proportion to its length, and is from half an inch to sourteen inches long. It is commonly found in clusters, but the columns do not adhere to each other, as in the former; and its brown colour is of various degrees, for some are pale, and others almost black. It is tolerably hard, strikes sire with steel, but will not readily calcine. It is very common in Germany, and is found in the cliss of rocks.

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Bright Brown imperfect CRYSTAL, with a short pyramid, is often tinged with various colours, but most frequently with a pale yellow; it is extreamly pure, and of a bright fine texture, though often covered with a rough coat. The column is long and slender, and it is generally met with about two inches long, and not quite half an inch in diameter, but the planes are irregular; it is commonly found single, though sometimes in large clusters, and is extreamly hard; it strikes fire with steel, and, after a considerable time, calcines to a pure white. It is found in the great mine at Gosslear in Saxon; as also in Virginia.

Bright Brown imperfect CRYSTAL, with a very long irregular pyramid, is called the Beryl by some jewellers, and has the greatest lustre of all the brown Crystals; but it is not very large, being only from half an inch to sour inches long, and has a thinner column than others of the same length. The planes are the same in number as in others; it is very hard, strikes fire readily with steel, and calcines very slowly. It is found in Italy and Germany, and is commonly

called by the jewellers, the Beryl Crystal.

Whitish imperfect CRYSTAL, with a very long pyramid, is, by some authors, called the *Iris* or Rainbow Crystal; it is remarkable for reflecting different colours,

WATERS, EARTHS, FOSSILS and MINERALS. 67.

colours, whence it has its name. It is not very pure. or fometimes there are large white flaky blemishes, but the form is perfect and regular; it is usually long and lender, and most commonly about three inches long. It is often met with in clusters of forty or fifty together; but the columns fingly touch each other; it is pretty heavy, firikes fire with steel, and in the fire

readily calcines and turns white.

Bright Yellow imperfect CRYSTAL, with a short pyramid, called Citrino by the jewellers, is very clear, pure, and of a fine texture, it being generally free from blemishes, and is from one to five inches in length; but commonly much thinner at the top than near the root. It is mostly found single, and is of a very beautiful yellow; it is not extreamly hard, but it will strike fire readily with steel, and calcines slowly to a whiteness in the fire. It is found in Bohemia and the West Indies, and is made use of for stones to set in

rings.

Short, Bright imperfect CRYSTAL, without any colour, may be distinguished from all others, by being very short in proportion to its thickness; it is almost always extremely pure and without blemish, and its figure has little variation. It is always fixed to some body or other, and is found of various sizes, from half an inch to three inches long, and the diameter is commonly two thirds of the length. A cluster of eight or ten of these is generally found together, but the columns feldom touch, and never adhere. It is remarkably hard, and will admit of a fine polifh. It is found in New-Spain, and other parts of America.

Brown imperfect CRYSTAL, with a rough coat, and five planes on the pyramid, as well as on the coumn, has a coarse and opaque coat, but the inside s never subject to any foulness. The column is thick and short, and the pyramid pretty long and slender; the most common size is three inches long, and near an inch and an half in diameter, and there are two proad planes on the pyramid, as well as on the column. The root is very small and inconsiderable; and it is usually found fingle, of a very beautiful brown, extremely transparent; and of a fine deep water. It is Vol. V. very

very hard, and calcines flowly to a pure white. It is found in the East Indies, and is in high efteem among the jewellers, it being the finest of all brown Crystals.

Brownish-white imperfect CRYSTAL, with a long pyramid, has twenty-four planes; that is, twelve on the pyramid, and twelve on the column. The texture is pretty sine, pure, and clear, though sometimes subject to foulness from slakes. It has a regular, pretty long and slender column, and is about three inches long, and little more than half an inch thick. The planes are all irregular with regard to breadth, and sometimes there is a part of them wanting. The root of this kind is long, large and whitish, and is usually found single. It is very hard, and calcines slowly into a perfect whiteness. It is found in the mountains of Silesia and Bohemia, as well as on the shores of rivers, and is in high esteem.

Yellowish-Brown impersect CRYSTAL, with a short pyramid, having twelve planes on the pyramid, and as many on the column, is of a pure, persectly fine fort, and is seldom subject to blemishes, though there are semetimes sound very small slakes of a whiter substance. The column is long and slender, and the usual size is about an inch in length. The planes are very irregular, with regard to breadth, and the pyramidal planes differ greatly in length as well as in breadth. It is extremely hard, and will calcine at length to a pure white. It is usually brought over

with the Saxon topazes.

Clear Colourless imperfect CRYSTAL, with a very short pyramid, and twelve planes on the pyramid, as well as on the column, is extremely clear, pure, and of a very sine texture, without the least spot of blemish. It is from one to two inches long, and some of the planes are broader than the rest. The surface of those on the pyramid are perfectly smooth, and those on the columns have deep ridges. It is commonly found single, is perfectly transparent, and has a sine bright water. It is remarkably hard, and is found in the East-Indies.

Colourless, very Bright, imperfect CRYSTAL, with a presty long pyramid, which has twelve planes,

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WATERS, EARTHS, FOSSILS and MINERALS. 99

and the column as many, is generally found in clufters, and is a pure, elegant, regularly formed Crystal, though generally very small, it being not above an eighth part of an inch in length, though it has been found half an inch long or upwards. The planes seem to be nearly all of a breadth, and of the same length, and the top of the pyramid stands over the centre of the column; the planes of the pyramid are always smooth, having a high natural polish, and a fine lively dark water. It is extremely hard, and is found in all parts of this kingdom, sometimes surrounding a single or double round ball, and at other times in the cracks, cavities, and clefts of slints, and other stones.

Blackish impersect CRYSTAL, with very short pyramids, with twelve planes thereon, and as many on the base, is thought to be the hardest and brightest of all the class. The column is somewhat longer, and the pyramid shorter, than in others of this kind. It is so extremely small as sometimes not to be discovered, unless by its glittering, though there are some the tenth part of an inch in length, and a few the third of an inch. It is shaped like the former, and has naturally a very sine polish; it is extremely hard, and is sound in great plenty in the forest of Dean in Glov-

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Imperfect CRYSTAL, with a blunt pyramid, and a very short column, each of which has twelve planes, is pretty pure and clean, though sometimes subject to spots and white opake slakes. The pyramid is blunt, broad, and fixed to a broad short column, that sometimes seems to the naked eye to be wanting. It is extremely small, the usual size being not above the twelfth of an inch in length, and nearly of the same diameter. There are various sizes in the same mass, there being small ones between the larger; but the surfaces are very smooth and pretty glossy. It is found together in large quantities, and is sometimes tinged with red or yellow. It is considerably hard and heavy, and found in Cornwal, Yorkshire, and other counties of England.

Whitish Transparent impersect CRYSTAL is somewhat like the common Crystal, and, at first fight,

feems to have the same number of planes. It is pretty fine and pure, and is of a perfect regular form, being in the shape of a pyramid with four sides, and is pretty broad at the bottom. It is generally about half an inch high, and almost as much in diameter; but there are some two inches high. However, it is often met with in large clusters, and the largest fingle Crystal is no bigger than a grain of barley. When it is found fingle, it always adheres to some fossile body at the base, and is principally met with in Devenshire and Cornwal.

Colourless, Transparent, impersed CRYSTAL, confifting of fix planes, is perfectly pure, fine, clear, and broad in proportion to its length. It is very small, being generally of the fize of a grain of Wheat, and the largest is seldom more than the third of an inch in length. It is but thin in proportion to the fize, and fometimes all the planes are perfectly smooth; and fometimes with ridges, appearing fireaked near the extremities. It is fometimes found fingle and loofe, and at other times in clusters that hurt each other. It is extremely heavy, very hard, and is found in pretty large quantities among the iron ores of the forest of Dean.

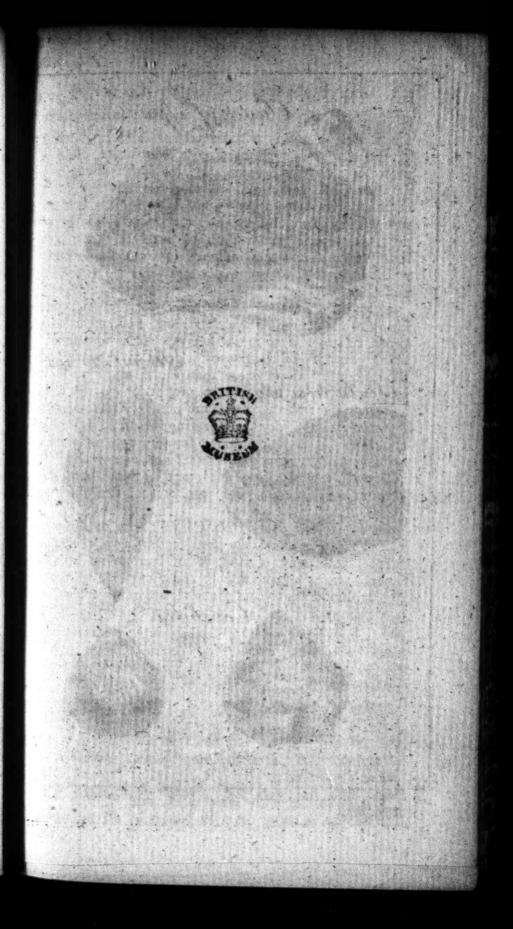
Black, Gloffy, Imperfect CRYSTAL, of a rhomboidal form, is extremely pure, and of a very regular shape. It is from a third of an inch to an inch in length, and is bright, smooth and gloffy. The larger fort is usually fingle, and the fmall are in larger maffes, of a fine blackish colour, and calcines to a fine purplish red. It is met with on the surfaces of the perpendicular cliffs, in the iron mines of Gloucestershire. There are many other forts of crystals; but to enumerate them

all would be tedious and useless.

CHAP. XVI.

Of SPARS, of various Figures and Shapes.

PAR, with a narrow oblong pyramid, is very like Crystal with eight fides, and is of a pure fine texture, it being the most perfect of all the whole class,





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class, having a column with lingle angles, with a pyramid, confiring of the same number. The column is pretty long, but not thick, and the pyramids are remarkably flender and pointed. The common fize is the twelfth of an inch long, though some have been seen of three quarters of an inch. The larger specimens are generally found loofe; but they are most commonly among the coarfer firsts of flones, and is fometimes tinged with a faint purple colour; It will not firike fire with steel, but will dissolve in aqua fortis, and will calcine eatily in a moderate fire. It is found in the mountains of Germany, and in North Wales.

SPAR, with very thort pyramids and a long column, is perfectly pure, and a regularly formed body, confissing of a pretty long and thick hexangular co-lumn, terminated by a very short pyramid with the same number of sides. It is commonly about an inch long, and the third of an inch in diameter. It will not firike fire with feel, but will ferment with squa fortis, as will indeed every kind of Spar, and therefore this needs not be repeated. It is found in Suxony,

and fometimes in Hartz forest.

SPAR, with thort pyramids, and a very fliott co-lumn, may easily be diffinguished from others by its fhape, and is of a pretty pure and fine texture, but not fo clear as the former. It is generally found in clusters of eight, ten, and twelve together, and has a

dusky hue, with very little transparency.

SPAR, with very short and broad pyramids, is extremely pure, and of a perfect fine texture, having a pretty long and thick column, with a depressed pyramid at each end, each of which has five fides. It is fometimes met with an inch long, but the commonest fort is exceeding small, and is lodged in the strata of clay. It is found in Derbysbire, Yorksbire, and Cornwal.

SPAR, with long pyramids and a long column, which confilt each of three fides, is pretty pure, but has a whitish cast and a dullish look. It is commonly about an inch in length, and half an inch in diameter. It is confiderably heavy, but very foft and eafily

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scratched. It is found in Germany, and sometimes in

Cornwal and Devonsbire.

Slender SPAR, with very short pyramids, consisting of three sides as well as the column, is generally pretty pure, and of a fine texture, though sometimes subject to blemishes. The common size is three quarters of an inch in length, and is of a blueish white, but sometimes approaching to a lead colour, or a yellowish brown. It is very soft, and is sound in England, Ireland, and Germany.

SPAR, confisting of two long pyramids without a column, each having eight fides, is very pure and fine, and commonly about three quarters of an inch long. It is very transparent, though it is somewhat of a

whitish colour.

SPAR, with short and sharp pointed pyramids, each consisting of eight sides and without a column, is very pure, and is remarkable for its short points and broad basis, and is often sound half an inch thick, but never longer than two thirds of its thickness. This, as well as the former, is found in Hartz forest, in Germany.

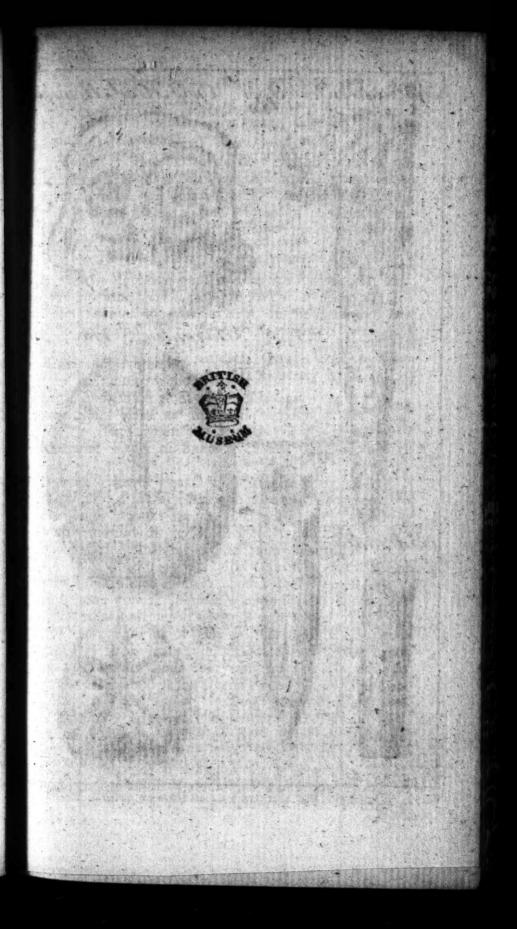
SPAR, with long narrow sharp pointed pyramids, consisting of fix fides each, and without a column, is generally fine, clear and pure, though sometimes cloudy. It is often an inch in length, but not a third of an inch in diameter, and is very soft. It is found

in the mines of Mendis hills.

SPAR, with short broad pyramids consisting of three sides each, and without a column, is very pure, sine, and clear, and is very short in proportion to its thickness. It is from half an inch to an inch and a half long, with very smooth glossy planes. It is pretty transparent, and brighter than most other Spars, as well as harder, though it will not strike fire with steel. It is found in Hartz forest.

Slender SPAR, with a long pyramid, confifting of fix fides, has often been mistaken for a Crystal, it having a long stender hexangular column. The texture is extremely fine, though it is sometimes subject to slaky slaws, and is commonly two inches long, and a third of an inch in diameter. It is not so bright as

Crystal,



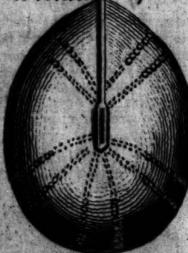
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WATERS, EARTHS, FOSSILS, and MINERWIS. 103

Crystal, and is sometimes of other colours, which are very lively and beautiful like gems; but it is soft, and

found in Mendip hills.

SPAR, with a very short pyramid, consisting of fix sides as well as the column, is generally very pure and clear, though sometimes blemished, and the common size is about an inch and a half. It is naturally of a greyish white, very transparent, and pretty bright; however, it is sometimes tinged with other colours. It is very soft, and sound in the mines of Derbysbire.

SPAR, with a very long pyramid, consisting of five

SPAR, with a very long pyramid, confifting of five fides as well as the column, always adheres to some folid body, and is of a clear fine texture. It is feldom more than a quarter of an inch thick, and the third part of its length high. It appears very smooth and gloffy, and looks like Crystal, though it is sometimes tinged with other colours. It is pretty hard, and is

found in Mendis hills.

Hard transparent SPAR, of the shape of a parallelopepid, commonly called Iceland Crystal, is extremely
pure, clear and fine, and is found of various sizes
from a quarter of an inch to three inches in diameter;
but its usual fixe is two inches and a half. It seems to
be smooth and even at first sight, though if nicely
examined ridges will be found upon it; it is almost
as transparent as fine Crystal, but is very soft, and
generally found single. It is found in Iceland, as also in
Germany and France; it consists of plates laid one upon
another, and will cleave in the manner of Tale; and
when it is reduced to powder it still retains its rhomboidal sigure, which may be discovered by a microscope.
It has this singular property, that all objects appear
double through it, which is owing to the double refraction of the rays of light.

Milk-White Opaque Shattery SPAR has a pretty fine and perfectly equal texture; but has no determinate shape, and is found from an inch to a foot in diameter, with a rough irregular ragged surface; it is sometimes a little brownish, and sometimes inclining to a dusky red, and is pretty hard. It is sound in France and Germany, and in some of the clifts of the Welch coasts, as well as in Yorkshire and Scotland.

F 4

Hard.

Hard, Grey, Transparent SPAR, is of a pure equal texture, and has the appearance of Crystal, though it is sometimes tinged with the colour of gems. It has usually the figure of common shints with very uneven surfaces, and the fize is from two inches to six or eight in diameter; it is frequently tinged with green; and sometimes with yellow. It is pretty hard, and is found in the lead mines of Scotland, and in other places.

Transparent, Colourless, Shattery SPAR, is nearly like Crystal, and is of a pure, fine, regular texture; but it has no determinate figure, being found of various shapes and sizes, that is, from half an inch to five inches in diameter; it is dark on the outside, but when broken is extremely bright and glossy, and with a small blow it will fall into many rhomboidal thick masses. It is not very hard, and is found in Hartz forest.

Naturalists divide Spar into innumerable other classes; but, after the Reader is well acquainted with such as we have here mentioned; he will easily distinguish those of an inferior fort, without being burthened with a long account of them in print.

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CHAP. XVII.

Of Crustated SPARS debased with Earth.

HARD, Semi-Transparent, Yellowish-Brown SPAR, has an equal regular texture, though not very fine, and the earth is regularly diffused throughout. It always conforms to the shape of the substance to which it is joined, and confists of a thin crust extended over flat, round, and irregular surfaces. It is from the twentieth part, to the third part of an inch thick, and is from a few inches, to many feet in breadth. It is very soft, and is found in many parts of England.

Brittle, Transparent, Whitish SPAR, is of a pretty pure fine texture, though sometimes transversely streaked with earth, rendering it red, yellow, brown or black; it is formed like a crust, and is sometimes flat. It is

found

WATERS, EXETHS, FOSSILS and MINERALS. 105

found on the fides of the perpendicular clefts of the mines in Germany, and the caverns of Mendip hills.

Hard, Whitim-Brown, Dufky SPAR, is foul and impure, though of a regular texture: it is extended over various bodies in the form of a cruft, and is from an inch and a half broad to five or fix feet. It is pretty hard, and is found in Hartz forest, as well as in the lead

mines on Mendie hills.

Dull Pale-Brown, Brittle, Coarle SPAR, is the most common of all the crustaceous Spars, and is very coarfe, impure and earthy, being often tinged with various colours, by the different earths it is blended with. It is of no certain fize, and it conforms to the shape of the mass to which it gives a coat. It has a pretty even furface, the wrinkles being never deep; and, when broken, it is of an irregular texture. It will readily crumble between the fingers, and is found as well on the infide of pipes for water, as in tea kettles,

White, Light, Brittle, Earthy SPAR, is the coarlest of any of this kind, and the whole mass is light, loofe and brittle; for fome of this kind will not bear touching without crumbling to pieces. It has very luxuriant efflorescences on its surface, and more than any of these bodies. It is met with in various places.

Light, Hard, Pale-Brown, Earthy SPAR, with a fmooth furface, often incrusts round moss, for which reason some have taken it for petrified moss. It is of an equal uniform structure, but foul, and always affumes the shape of the body it is formed upon. It is pretty hard for an earthy Spar, and is found in all parts of the world.

Whitish, Brittle, Crustaceous Earthy SPAR, with a rough furface, is of a very coarfe, foul, impure texture, and of an earthy colour. It is always of the shape of the thing it incrusts, being sometimes met with on small stones, branches of moss and the like. It is of a dull whitish colour, without the least brightness, and is very foft and brittle. It is found in the fubterraneous caves of various countries.

Hard, Pale-Brown, Thick, Rough, Earthy SPAR, which is the offeocolla of the fliops, is of a very coarse, foul and impure texture, having the appearance of hardened marl. It is always found in long,

F 5

thick,

thick, irregular, cylindrical pieces, usually hollow, and sometimes filled up with a softer substance. The surface is always rough and deeply wrinkled, being without the least brightness. It is very hard, and is found in many parts of Germany. It has sormerly been much esteemed as a medicine, though it is now out of use.

Whitish-Grey, Brittle, Earthy SPAR, with a smooth furface, by some called the Fossile Unicorn, and by others Stone Marl, is of a stony substance, and in colour, fmoothness, and form, represents the horns, teeth or bones of animals; but sometimes it is softer, with a hard yellowish, blackish, or ash coloured crust, while it is foft and brittle in the infide. This has an aftringent talte, and adheres firmly to the tongue. It. is frequently dug up in pieces refembling bones that, are petrified; among which are the teeth called grinders and incifors, which are extremely large, to which, there is a root plainly connected. Sometimes they look like the fragments of bones of the arms and legs: and fometimes they appear like the branches and trunks of trees turned into flone. They are found in various parts of Germany, as also in a hill near Paris, where they appeared to be real bones, covered over with a stony substance. It is commended by the Germans for being an aftringent, promoting sweat, and for stopping bleedings and loofenesses. It is given, in the epilepsy from half a scruple to a drachm.

Whitish-Brown, Tuberose, Unequal SPAR, in the stape of coral, is of a pretty fine texture, and contains less earth than others of this kind. It is commonly in the shape of a small oblong cylinder, with a pretty even surface, though it has often several branches like the coarser white sossile corals. It is about two inches and a half long, and the third of an inch in diameter; when broken, it is firm, solid and compact. It is sound lodged in the strata of yellow clay, and is very common in France and Germany; it is also met with near London.

Hard, White, Oblong, Conical SPAR, is extremely pure, and is as crystaline as any Spar whatever. It has the appearance of an icicle, broad at the base, and tapering towards the point; and its natural place is

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WATERS, EARTHS, FOSSILS and MINERALS. 107.

the arched roof of a subterraneous cavern. It is found from an inch to fifteen inches in length, and is sometimes persectly round. These Spars are formed by water dropping from the roof of these caverns; and consequently it is often met with in a petrified state on the ground formed into various shapes; we have a remarkable instance of this in Pool's-Hole in Derby-shire, which is considered as one of the wonders of the Peak.

There are also other Spars of various colours, which are found hanging to the roofs of caverns; but which, in reality, differ very little in their nature from the.

former.

C H A P. XVIII.

Of SALTS.

COSSILE SALT, commonly called Sal-Gem, is of feveral kinds; it is almost as transparent as Crystal, and is sometimes as white as snow, at others grey. red or yellow. When dissolved in water and crystalized, by evaporating the moisture, it becomes of a perfect cubical shape. It is called Sal-Gem, because : it has some resemblance to stones of that kind; but it may be readily distinguished from them, by applying it to the tongue. There are large rocks of this kind in different parts of the world, particularly in Spain near the river Ebro, and there is one of a purple colour in Portugal, and in Poland and Ruffia there are feveral. It is pretended in Spain, that it grows as fast as it is taken away; however, it is certain, the mine has been opened five hundred years. In Poland, fix: miles from Cracow, they hew the Salt out of the mountain, in the same manner as they do stone, in very large pieces. It has the same virtues as common Salt, and is used as well for glysters as suppositories to evacuate the hard excrements. But this must never be used where there is an inflammation of the intestines.

Common SALT is either made with fea-water, falt fprings, or wells, by the heat of the fun, or by boiling. In some places they dig pits near the sea, and line them with clay; they afterwards fill them F. 6.

with fea-water at high tides, and the water being exhaled by the heat of the fun, there is left plenty of Salt at the bottom. In Neuftria, that is, in the western parts of France, they heap up the fand on the fea-shore, on which they pour fea-water often, and after the moriture has been exhaled by the heat of the fun, the Salt is left behind. When there is a fufficient quantity, they boil it in fresh water, and then strain it off into leaden vessels, when they boil it again till it is become of a proper thickness; after which they remove the fire, and fuffer it to coagulate into whitish crystals of Salt. They make Salt from falt springs much in the same manner, though there is a particular art in causing it to granulate; for some mix bullocks blood therewith, to cause a quicker separation of the Salt from the bittern, This likewise frees it from the bituminous and earthy particles mixed with the Salt, which are either carried off in froth, or remain in the bottom of the pans. But that is the best Salt which is made with lakes of fea-water, by the heat of the fun, because that which is made by fire has generally fomewhat of bitterness. That made with the water of falt fprings or wells is most pungent, on account of the alkalious mineral Salt mixed therewith; and is more ant to diffolve than the former, even with a moist air; therefore, that made with fea water by the heat of the fun is more fit for medicinal purposes, and is commonly called Bay Salt. This Salt also, when diffolved and crystalized, is of a cubical form; but that made either with falt fprings, or fea-water, by the affiftance of fire, cannot be brought into exact cubes, on account of its mixture with other Salts. Bay Salt diffolved in water, which being evaporated till a cuticle appears, will shoot to cubical crystals when cold; but that which is left, being of an alkaline nature, cannot be crystalized into any regular figure; however, there is a Salt made therewith, which is now generally known by the name of Epfom Salt. The spirit of Salt, when mixed with an alkaline Salt, as long as they will ferment together, will turn to common Salt, which in its tafte, and its cubical shape, sesembles Bay Salt; whence it appears, that sea Salt

WATERS, BARTHS, FOSSILS and MINERALS. 100

is an acid perfectly faturated with an alkaline Salt. The use of sea Salt is well known for its preventing slesh from putrisaction; and therefore is necessary to hinder the fermentation of victuals, and their corruption; it likewise restrains the heat of the stuids in the body. Besides, when volatile urinous salts are mixed with it, it turns into a Sal-Ammoniack, which is proper to temperate the sharpness of the humours, and to cleanse them by urine. People are in doubt whether it prevents or breeds stones in the kidneys, for many affirm, that the latter is true; but then it must be understood of meats that are rendered hard by being overfalted. The spirit of Salt is proper to promote urine, to prevent the stone, to cure the dropsy, and to quench thirst in burning severs. It is excellent against the scurvy, and is given from three drops to twenty or upwards; or as much as will make any lfquor agreeably acid. Dulcified spirit of Salt is given from fifteen to twenty drops every morning, in a decoction of juniper berries.

NATRUM, or NITRUM, of the ancients, is vaftly different from the Nitre of the moderns. By old authors, it is faid to be an acrid Salt of an alkalious nature, brought from Egypt and other places, which would ferment with acid liquors, and was used for washing of cloaths and for making glass. Natrum is now found in Leffer-Afia, in little hillocks, like mole-hills, in the spring and summer, of which they make a lye for washing their linen. It is at present seldom feen in Europe, though it was of frequent use with the ancients, not only for medicine, but various other purpofes. The natrum of the ancients was a native Salt of a whitish colour and a bitterish taste, which did not crackle in the fire like common Salt, nor flash like Saltpetre: but it would melt and fwell like alum and borax, as well as ferment with acids; whence it appears to be much of the same nature as pot-ashes.

NITRE of the moderns, commonly called SALT-PETRE, is a white crystaline substance, of an acrid bitterish taste, and seemingly a little cold. Its crystals are in the shape of prisms, with fix sides, which are slender, long, equally thick, and terminate at each

end, like a pyramid with a point. It dissolves readily in water, melts over the fire, and will not stass, unless mixed with sulphur or charcoal; and then it will with great violence. Saltpetre is often seen on old walls that are not washed by the rain, from whence it is taken off with brushes. Artificial Saltpetre is made with earth saturated with common or pigeons dung, whose salts will, in time, be converted into Saltpetre. As Saltpetre cannot be obtained, except from earth impregnated with urinous, animal, or vegetable Salt, some are in doubt whether it is a mineral or animal production; but it is generally reckoned among those that are mineral, because it may be extracted immediately from the earth, and not from any excrements themselves, unless they be mixed with earth.

The spirit of nitre will dissolve silver, whence it is called aqua fortis; and it will communicate the same: power to spirit of vitriol and spirit of sulphur. However, aqua fortis will not dissolve gold; for that is only,

to be done with aqua regia.

NITRE is used in medicine to cool the blood, and to restrain the heat of a fever, to allay thirst, and to hinder putrifaction; for which reason it is commended in malignant cases. It is given from three grains to a scruple, three or four times a day. A drachm. given every morning, dissolved in a draught of ale, has been found to cure the dropfy. When Nitre is put into a crucible, and placed over the fire, it will melt like water; and then, if powdered charcoal be thrown into it, it will deflagrate with a noise, which being over more powder must be thrown in, and this must be repeated till the Nitre will flame no longer. By this method, the Nitre will turn into an alkalious falt, which has the same virtue as falt of tartar. Every one: knows, that Nitre mixed with due proportions of fulphur and charcoal will make gun-powder.

VITRIOL is either native or factitious, and, with regard to the colour, is distinguished into white, blue and green. White Vitriol is brought from Germany in large lumps, which look almost like loas sugar, and has a sweetish astringent taste. It is found in mines at Glosslaer in Saxony, where it springs forth from the

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WATERS, EARTHS, FOSSELS, and MINERALS. LIT

fides, under the appearance of a woolly substance, which being dissolved in water, must be boiled to a due thickness; and, at last, it will turn into a white mass like sugar. Sometimes there are found in the same mines pieces of Vitriol, which are already crysta-

lized, and appear transparent.

Blue VITRIOL is dry to the touch, and is formed into blue crystals, like saphires, of a rhomboidal form, but stat, and with ten sides. It is prepared in various places, but more particularly in Cyprus and Hungary; whence it is commonly called Hungarian and Cyprian Vitriol. It obtains its fine colour from copper, and has an austere taste, with great sharpness.

Green VITRIOL is of an herbaceous colour, and has various names, according to the different places from whence it is got. It abounds with iron from whence it has its colour, and is either in large crystals of a rhomboidal form, or in bits composed of crystaline grains united together, which feel a little

oily to the touch; it has a sharp styptick taste.

VITRIOL is nothing else but an acid vitriolick falt, which by corroding zinc, copper, or iron, coagulates with them, and so concretes into a transparent body, which takes its colour from the metal. Blue Vitriol is now got in Hungary from water in the copper mines, near Smolnik and Newfol, by evaporation; and green Vitriol is obtained in Germany after the fame manner. But in England, at Deptford, near London, green Vitriol is obtained from a stone, called Pyrites, which is heavy and brown on the outfide; and, when broken, there are rays that appear to run from the center to the circumference; and confift of particles that shine like brass, and yet are without any taste. These stones, after they have been exposed to the air for some time, undergo a fort of fermentation, and then crack into clefts, out of which a kind of white down of a faltish nature springs forth, which has an acid flyptick tafte; at length the whole substance difsolves, and turns into a fine saltish powder, of a vitriolick taste and sulphureous smell. If these stones are calcined in the fire, a copious smoke will exhale from them.

them, with a fulphureous finell, and a red calx will remain behind, containing a little iron and copper.

White VITRIOL is extremely good for making an eye-water, which is, perhaps, the best hitherto known for abating inflammations of the eyes, and to repel sluxions thereon. It is made by dissolving a scruple of vitriol in hot rose water, and then passing it through a linen cloth: a few drops of this are to be put into the eyes. When blue vitriol is calcined, it is very proper for stopping hamorrhages, by cauterizing the vessels, and condensing the blood therein. Spirit of Vitriol, like other acid spirits, restrains the heat of the humours, stops hamorrhages, and promotes urine.

ALUM is either native or factitious; but the former fort is now little or not at all known. The factitious is distinguished by the name of the country it comes from, it being of several kinds; for there is scarce a country in which it is not made. One fort is called Roch, or Rock Alum, because it is sometimes got out of a rock, where it is often met with in very

large pieces.

In Yorksbire and Lancasbire they get their Alum out of a blueish stone, like slate, that is full of sulphur. It is a fort of Pyrites, which will kindle in the fire, and being exposed to the open air will break of itself. The fragments of these stones are laid in heaps, where they are burnt in the open air; and when the fulphur is quite exhaufted, the fire will go out of itself, after which they steep the calcined stones for twenty-four hours in water, when it is drawn off into leaden cauldrons with the lye made with the ashes of a fea-weed. After the liquor begins to boil, they pour urine therein, which causes the fulphur, vitriol, and earthy matter to fink to the bottom. This done they take the liquor and pour it into vessels made with deal boards, where, in time, the Alum concretes to the fides, in white transparent crystals, which, after washing, are melted in iron cauldrons; after this it is poured into a tub, and forms a mass of the same fize. However, in different countries, they have different methods of making Alum, which would be tedious, as well as ufelefs, to relate, Alum

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Alum is of a very binding nature, and has always been looked upon as a great flyptick. That of the ancients had a fmell like aqua-fortis, but the factitious has none at all; and, when placed over the fire in an iron pan, it bubbles up and melts like water. When Alum is fet to crystalize, it concretes into a figure with eight fides, which looks like a triangular pyramid, with the angles cut off; infomuch that it is composed of four hexagon furfaces, and four that are triangular. From a chemical analysis it appears, that Alum confifts of an acid vitriolic falt, and an aftringent earth or bole intimately united. Alum is recommended for fwellings of the gums, and against the fluxions upon the tonfils. When burnt, it will take down proud field in wounds and ulcers; it is of no use internally, only it is fometimes given with a large portion of nutmeg man he takedal for the cure of the ague.

SAL AMMONIAC, of the ancients, was a fort of fossile Salt or Sal-gem, though Disserted would have it to be a kind of common Salt, which is dense, transparent, white, easily cloven, and dug out of the earth; all which have the properties of Sal-Gem; for it will

readily cleave into plates.

Factitious SAL-AMMONIAC is of two forts, one of which is brought from the *East-Indies* in conical pieces like fugar loaves, of an ash-colour; but this is very scarce. The other and common fort is brought from *Egypt* and *Syria* in slat cakes, convex on the upper part with a fort of a navel, and a little hollow on the other; they are about a palm in breadth, and three or four inches thick, of an ash-colour without, and whitish within.

SAL-AMMONIAC is a very useful medicine, for it dissolves thick clammy humours, and carries them off by sweat and urine. Some commend it in agues, given to the quantity of half a drachm, with a scruple of crabs eyes before the fit. The Volatile Salt and spirit of Sal-Ammoniac are good in a lethargy, apoplexy, fainting, giddiness of the head, and hysteric fits, being held to the nose. Internally, the spirit promotes a diaphoresis, sweat and urine; it blunts acid humours in the body, promotes the circulation of the

blood.

blood, refreshes the spirits, excites the oscillations of the nerves, and opens obstructions. Whence it is good in the apoplexy, epileply, lethargy, fleepy difeafes, and in hysteric fits. It may be given from fix

drops to a dram in any proper liquor.

BORAX is of two forts, the one native, and the other refined. Native Borax is brought to us in bits of the fize of large hazel nuts, and of a dark greencolour, covered with a fort of earthy fat matter. It is found in various places, and is brought from the empire of the great mogul, and from Perfia, where it is found in mines of metal, especially those of copper, from whence proceeds a faltish, muddy, greenish water, which is carefully catched, and being evaporated into a proper thickness, is afterwards poured into pits lined with a paste, made with the mud of these springs, and the fat of animals, which are also covered with the fame paste. After some months they are opened, and find the water concreted into stones. When Borax is purified, it appears clean, white and transparent, somewhat like the crystals of Alum, with a slight faltish tafte, and a lixivious sharpness. It is of the same substance with the native, and was formerly brought from Venice. It is imported to us from the East Indies, and principally from Bengal. When Borax is placed over the fire, it swells like Alum, and at length melts into a hard transparent mass, resembling glass, which, however, will dissolve in water. After examination, it appears that Borax is a fort of a fixed Salt not unlike that of Tartar; but differs from it in joining with acid Salts, without any effervescence. Borax is used by goldsmiths for soldering gold, and to render the melting of metals more easy; likewise, it is employed by some dyers to give a gloss to their filks.

CHAP. XIX.

Of SULPHURS, BITUMENS and COALS.

Ommon SULPHUR, or BRIMSTONE, is either native or factitious, on rather depurated. Native Sulphur, commonly called Sulphur Vivum, is either transparent or opaque; the transparent appears like a gem

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WATERS, EARTHS, POSSILS, and MINERALS. 215

gem of a gold colour, though some is met with that is yellowish or greenish. It is sound in the gold mines of Peru, particularly in Quito, on the island of Milo, in the Archipelago, and in the canton of Bern, in Swifferland. The opaque is usually met with in hard solid masses of a greenish shining colour, or under the form of an ash-coloured clayey glebe, inclining to yellow. It is in the greatest plenty at the feet of the mountains that throw out fire and smoke, such as Vesuvius, Eina, Hecla, and the like; as also in some parts of Europe and America, where there are sulphureous earths or sountains.

Factitious SULPHUR is prepared several ways; for in some places it is boiled in water, as at Buda in Lower-Hungary. At Aix la Chapelle, in the hot baths, Sulphur is raised in vapours from the water, and sticks to the cover of the spring in hardish lumps, that have the appearance of slower of Sulphur, and a great quantity of this is gathered every year. Sometimes it is extracted from a whitish clayey earth; and is as often obtained from the stone called the Pyrites, particularly in the diocese of Liege, where

ORPIMENT is an arfenical juice, compacted into glebes, confisting of thin scales or leaves, almost like Ising-glass, which may be easily separated from each other. There are three kinds, one of which shines like gold, another is reddish mixed with a citrine colour; the third is greenish and mixed with earth; but the first is best. They are found in mines of

they are found like lead ore.

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gold, filver, and copper.

ORPIMENT has a sharpish taste, will dissolve in oil, readily take fire, and emit a copious sume, between the smell of sulphur and garlick. By the heat of the fire it will dispense in plentiful sumes, which is collected, concrete in yellowish slowers, like sulphur; and at the bottom of the vessel there will remain a blood-coloured melted mass, which, when cold, becomes thick and solid, like cinnabar. This, by some, is called red Orpiment, or Realgar. If this mass be kept longer over the fire, in a sublimating vessel, it will rise to the upper part, and there con-

116 The NATURAL HISTORY OF

crete into a transparent, red, elegant substance, like a ruby; but at the bottom there will remain a little metallick earth.

Hence it is plain, that Orpiment confifts of the fame principles as common Sulphur, only it is mixed with fome mercurial particles. Some take it to be of a very poisonous nature; but Hoffman, after many experiments, by giving it to dogs, has found that it is entirely innocent. It is made use of by some barbers, mixed with hime, to take off the hair where it is superfluous; but if it lies on long, it will corrode the

skin, which doubtless is owing to the lime.

REALGAR, called ZARNICK by fome, is, by others, named Red Orpiment. It is of two kinds; that is, native and factitious. The native, which is got out of mines, is of the colour of cinnabar, and finells like a mixture of fulphur and garlick when it is burnt. The factitious is made with Orpiment in fublimating vessels; for the yellow part will rife to wards the top, and the mass that remains at the bottom is the Realgar. However, we are not to confound this with the red factitious Arsenick hereaster described.

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Realgar is brought into Europe from China, in feveral shapes, which they call Pagods, these seem to be made by melting, not carving. Some antient phyficians have given this inwardly; the natives of the East-Indies make cups herewith, and the water poured therein, after some time, is used as an excellent remedy against several diseases. Some think that it would not have the like effect on European bodies; for they suppose the nature of man in the East-Indist and our's to be greatly different; but this is a miltake. However, it is uncertain whether Realgar be as innocent as Orpiment, or not; but that it is not poison is certain, for Hoffman gave two scruples of it to a dog, without the least bad consequence, and he was as well afterwards, as if he had taken nothing; but this is not the case with the flowers of Orpiment, for a scruple of these being given, it excited enormous vomiting; however, it did not kill, but if the flowers are obtained another way, that is, by mixing four

WATERS, EARTHS, FOSSILS and MINERALS. 117

four ounces of Orpiment with three ounces of oil of Vitriol, they will yield an ounce of the flowers adhering to the neck of the retort, which are entirely innocent; for they are almost tasteless and promote sweat more powerfully, perhaps, than any other medicine.

ARSENICK, properly to called, is in Bobenia and Saxony extracted from a mineral called cobalt. If this be mixed with calcined flints and pot-ashes, the mixture, in a very strong fire, will turn into a glass of a blueish colour, that when reduced to powder is called fmalt. In the preparation of this glass a copious fmoke is exhaled, or rather flowers, which flicking to the fides of the furnace, and collected together, appear in the form of a white powder, which put into a crucible, and melted in an exceeding strong fire, turns into a white, heavy hard glassy mass; and this is named white Arlenick, which is a most dangerous poison. But when to ten parts of the former powder, one of fulphur is added, and melted, as before, then yellow Arfenick will be produced. Again, if two parts of the fulphur are added to ten of the powder and melted, as before, it will turn to a reddish mass, which goes by the name of red Arfenick.

COBALT itself is a fossile body, which is heavy, hard, and almost black, not very unlike antimony; it has a sulphureous, nauseous smell, when kindled in the fire, and is commonly mixed with a portion of brass, and sometimes of a little filver. Cobalt is sound in some parts of England, and particularly in Mendip hills in Somersetsbire; but some think it is not

so good as that of Saxony.

NAPHTHA, or PETROLEUM, is a mineral oil of a bituminous nature, which is inflammable, and has a fragrant smell. It is of several colours, as white, yellow, red, and blackish. There is scarce any country where this bitumen is not to be found; but in the island of Sumatra there is an excellent fort, which by the inhabitants is called miniac tanna, which fignifies oil of earth; and this is in high esteem in the sast-Indies. The Italians are lavish in their praises of the Petroleum found in Modena, and obtained

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118 The NATURAL HISTORY of

from certain springs and wells. The earth of this dutchy abounds therewith; but that is most remarkable which is met with in the place called Il Fumento, where there is a well near forty yards deep, whose water is mixed with this oil. Twelve miles from Modena there is a noted rock, where there is a spring, on whose water a yellowish oil is seen swimming; and this will produce about twelve pounds of this oil in a week.

Petroleum readily flames, for which reason, in many places, it is used for lamp oil. It consists of fine volatile parts, upon which account, if a candle be held over the wells or fountains that yield this oil, the vapours will readily take fire. It is difficult to unite spirit of wine with Petroleum, it being of such a fat consistence. That Petroleum is generally counted best which is fresh, white, transparent, and has a subtile bituminous smell; the next in esteem is the yellow, then the red, but the black is worst of all. A few drops of this oil is given to children to kill worms; and it is used outwardly in the passy, and for

cold pains of the nervous parts.

Mineral PITCH is a kind of reddiff or blackish bitumen, having a fragrant bituminous smell. It is of a middle confishence between petroleum and bitumen, and is not unlike tar. It grows more fluid in hear, and thicker with cold; and it emits a flame when kindled. It is by some authors called Pissasphaltum, and springs out of the earth in several places between the chinks of stones. That at Castro near Rome rifes through the clefts of stones, chiefly in the summer sime, of the confistence of honey, and is of a black colour and a most subtile smell. In Auvergne in France there is a plentiful spring of this bitumen, which has the appearance of tar, it being black; but if it be kept a confiderable time, it will grow harder, but not fo hard as pitch. That most common in England is Barbadoes tar, which is a liquid bitumen, and is used externally, for all pains proceeding from a cold cause; as well as numbness, cramps, and palfies. It is given, inwardly, in pretty large dofes, for the dry belly ach. IEWS.

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Jews PITCH is a fort of bitumen, which is folid, brittle, heavy, of a reddish black, shining, and inflammable, with a strong bituminous smell, especially when it is melted over the sire. It is found in several places, and particularly in Judea, from whence it has its name. It is found swimming on the top of the Dead-Sea, and is, at first, soft, thick, and may be readily pulled in pieces; but, by length of time, it becomes harder than common pitch; it is known in the shops by the name Asphaltum. The true sort is seldom brought to us; for what we have is entirely black; only when it is broken, it has a saffron colour cast.

AMBERGREASE is of an ash-colour, or grey, and is a fat folid substance, like suet, but light. It is variegated like marble, and is fometimes speckled with white; it fprings from the bowels of the earth, is condensed in the sea, and is found floating on the water, though fometimes it has been met with on the fea shore, where it has been thrown by the waves. It is fometimes black as well as grey; but the grey is accounted best. There is little room to doubt that this is a fort of bitumen, which proceeds from the earth near the bottom of the fea: for it fometimes contains stones, shells, the bones of animals, and the bills and claws of birds, as well as honeycombs, from which the honey has not been all loft. Hence it appears, that this bitumen must have been first in a liquid state; it has been sometimes found in lumps of above two hundred pounds weight. A great deal of this is got in the Indian ocean, about the Molucca islands; though it has also been found near Africa, and fometimes near the northern parts of England, Scotland, and Norway.

Ambergrease will readily melt in the sire into a fort of gold-coloured rosin, which will kindle and burn when held to a candle. It will not dissolve entirely in spirit of wine, but leaves a black pitchy matter behind it. The solution, after some time, will deposit a white cloudy sediment, which will coagulate by little and little, and grow thick, especially by the evaporation of the siner parts of the spirits of wine; this being dried becomes a shining sort of earth, not

much

120 The NATURAL HISTORY of

much unlike sperma-ceti. It consists of oily greyish particles, which are very fine and volatile, with others that are thicker, saline, and bituminous. Ambergrease is of great use among perfumers, and is recommended by physicians for raising languishing spirits, and increasing their motion; whence it is given for disorders of the brain and heart, as well as in fainting sits. The dose in substance is a pill of the size of a small pea, or from one grain to eight in a poached

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AMBER is a hard bituminous substance, brittle, fomewhat transparent, and of a yellow or citrine colour, though fometimes it is whitish and fometimes brown. The taste is somewhat acrid and bituminous, with a little aftringency; the fmell, when warm, is fragrant and bituminous; and when rubbed it will attract straws and bits of sticks by its electrical virtue. It is found in large quantities in Prussia, which is the country where it is chiefly got, particularly in the Baltick fea, near the shore of Sudavia, where it is found swimming upon the water, and is taken in nets. However, this bitumen is not a production of the fea; for its water only ferves to wash it off from the bowels of the earth, and remove it to places near the shore. The veins of this bitumen have been found, by the order of the king of Pruffia. In digging for them they first met with sand, which being taken away, a stratum of clay appeared, and still deeper there was another like old wood, under which there was the mineral of vitriol, which being exposed to the open air, it was covered with an efflorescence of green vitriol. Still deeper there was a fandy mineral, out of which, with proper instruments, they got Amber in various places. By this means, in the March near Kuffrin, as also in the Trad of Stolpen and Dantzick, it was met with among fand, and found collected in heaps; whence it appears they were greatly mistaken, who took it for the rosin of trees that dropt from them into the sea. It seems to proceed from the bituminous fosfile wood, just mentioned, by the affistance of the subterranean heat; which, at first, is probably like Petroleum, and after passing through the on allers to the gold on the state of the mineral

WATERS, EARTHS, FOSSILS and MINERAUS. 121

mineral of vitriol, by the mixing therewith, becomes coagulated into a hard body. There is no doubt that it has been liquid, because it is often found in a round form, containing feveral forts of infects therein; befides, the oil which is obtained from Amber, is, for virtue and fmell, like Petroleum. Charlton, who was a very great naturalist, has sometimes found real Petroleum included in pieces of Amber, which is a farther reason to prove what is afferted. The greatest plenty of this bitumen is found near the shore of Sudavia, after a violent north wind, attended with a tempest. Sometimes Amber is so transparent, as to ferve to make burning glaffes, one of which is kept in the cabinet of the Landgrave of Heffe-Caffel. Amber, properly prepared, thecomes a medicine for opening the obstructions of the bowels, and promoting all forts of excretions; and confequently is a very nieful remedy in chronical diseases. It is likewise said to be very efficacious in curing cold diforders of the brain. and particularly in pains of the head, fleepy and convulfive diseases, as well as in hysterick and hypocondriack fits. The dose is from a scruple to a dram in a poached egg, or any other proper vehicle. The volaile falt of Amber is diuretick, and accounted a speciick in hysterick and convultive diseases. The dose is rom ten grains to thirty. The oil is commended in pervous diforders, particularly in the gout, pally, and atarrhs, by anointing the parts therewith. It is given inwardly from two to twenty drops.

JET, called by some Black Amber, is a bituminous ubstance, dry, hard, black, smooth and shining, and eing set on fire turns almost like pitch, emitting a hick black smoke, with a bituminous smell. It issers very little from pit-coal, especially the finer sort, thich we call Kannel coal, if it be not the very same, differs from a bitumen in not melting as that will be, and when distilled it yields a sharpish acid phlegm, and then a black oil; but last of all a substance like outer, or thick oil. It leaves behind it a very black

put mortuum.

PIT-COAL is universally known in these parts, id when distilled in a retort, first yields a phlegm, Vol. V.

122 7% NATURAL HISTORY of

then a fulphureous spirit that is a little acrid, which is afterwards fucceeded by a fubtile oil, and then one that is thick, which finks to the bottom. With the greatest degree of fire there is produced a fort of an acid falt, like that of Amber, leaving behind it a light black earth. When the spirit is thrown on quick lime, it becomes volatile, and strikes the nose with a strong smell; spirit of nitre being added to this, a white smoke will arise, which yields a very pleafant fight. The fetid oil being mixed with falt of tartar, has the smell of a volatile falt, and when this mixture is distilled, it yields an alkaline, volatile, oleous spirit, which will turn fyrup of violets green; but if it be mixed with an acid, it will immediately ferment, and become of a bright red colour. The thick oil of coals has a fulphureous fmell, and being put into a filver spoon, with a gentle heat, will turn it blackish, which is a certain sign there is a true mineral fulphur contained therein, for common fulphur, diffolved in oil of turpentine, will do the fame. Hence it is plain, that coals contain nothing that is unwholesome; nor is there any arfenick at all in them, though fome have supposed the contrary. Nor yet is the mineral fulphur which they contain fo hurtful as some have imagined; for those that are employed in the melting and preparing fulphur are as well, and in as good case as other people, and much better than miners of other kinds. Coals are fo far from doing any harm, that they are rather beneficial, by drying up the too great humidity of the blood, and preserving the body from putrefaction; for it has been observed by Galen, that all bitumens, being kindled, mend the disorders of the air, by dispersing their too great humidity; which opinion has been hitherto followed by all physicians. Where the atmosphere is very moil, and full of watery vapours, so hurtful to human bo dies, the burning of Coals is certainly very proper In former times, when the plague and other infection difeases were common, they used to burn bitumen purify the air; and this is certain, that in London fince the burning of Pit-Coal has been almost univer fal, no plague has ever affected that city, nor any dis

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WATERS, EARTHS, FOSSILS, and MINERALS. 123
ease of that kind; and therefore there is no reason to
be asraid of it, unless it be brought from other countries.

There are mines of Coals dug in various parts of England, which generally differ, in some respect, from each other; those brought from Newcastle, improperly called Sea-Coal, are remarkable for their being generally small, and caking on the fire. These are the best for boiling slesh, which others, in various parts of the kingdom, will not do, particularly in Staffordsbire. Kannel Coal, which is dug up in Derbyshire and other places, is famous for its fineness, as well as hardness, though it will burn like a candle; there are now feveral things made with it, fuch as the tops of fnuff-boxes, falt-cellars, and the like. It is also found in Staffordsbire, and it is remarkable, that the choir of the cathedral church of Licbfield is paved therewith; that is, the black part with Coal, and the white with alabaster, which look like black and white marble. It will turn, like ivory, into ink-pots and candlefticks; and fome have their coats of arms carved thereon. The other Coals most used in London are brought from Wales and Scotland, and are valued for burning clear without a great deal of fmoke.

RARARARA

CHAP. XX.

Of METALS and SEMI-METALS.

A NTIMONY is a mineral, confishing of sulphur and a mercurial arsenical substance, as is universally allowed by the chemists. It is solid, heavy, brittle, of the colour of lead, consisting of long shining streaks, and will melt in the fire, but is not malleable, in which it differs from a metal properly so called. There are several kinds of it, one of which looks like polished lead; but it is brittle, and mixed with a fort of crystaline stone. Another consists of slender shining lines, that look like needles placed in rows, in some places, and in others without any order. A third kind

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724 The NATURAL HISTORY of

is made up of broader shining plates; and a fourth of small lead coloured rods, which melts in the fire as readily as sulphur, on account of the large quantity of that substance contained therein: this is found in Italy, near Massa in Tuscany. There is still another kind, which may be distinguished by saffron coloured, or reddish spots dispersed here and there; and this is met with in the gold mines of Mungary. In short, there is scarce any part of the world where this mineral is not to be found, and though they seem to be of so many different forts, yet their natures are nearly the same.

The Glebe of Antimony is generally mixed with a flony substance, which it is freed from by melting. They first break it into bits, and place it over the fire in earthen vessels, with holes at the bottom, under which there is another earthen veffel in the form of a cope, and when it is in fusion it runs through the holes, and leaves the drofs behind. That which is hard, heavy, of a lead colour, with fhining freaks, placed like rays, is accounted the best, and the Hungarian Antimony for this reason is chosen for medicinal purposes. The fulphur in Antimony may be readily perceived, not only from the fmell, but from the blueish flame it emits while it is melting. Besides, when nitre is thrown into the crucible, containing red hot Antimony, it flashes in the same manner as with common fulphur.

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It was formerly thought, that the sulphur of Antimony partook of the nature of gold; for which reason they employed themselves to little purpose in making experiments to extract the sine sulphur therefrom. Notwithstanding this, it is now generally acknowledged, that the sulphur of Antimony is exactly of the same nature as common sulphur, though all the reguline parts are seldom extracted from it; nor yet can that be called the pure sulphur that rises in slowers, when sublimed; for, though it takes fire like sulphur, yet the sume is of a whitish-yellow like that of orpiment. Besides, that it is not pure, may be known by its effects; for it will occasion violent vomiting, which is a certain sign that it is not entirely freed from the regular

WATERS, BARTUS, FOSSILS and MINERALD. LESS

lime particles. If you take white arfenick and mix it with half fulphur vivum, and afterwards fublime the mass, there will arise reddish flowers, which, when taken inwardly, have a very violent operation, and when they are set on fire emit a reddish sume; for there is such a sorce in mineral sulphur, that it will readily join with the arsenical particles, and early them up

therewith, when sublimed.

There is no substance in the world that yields so powerful a poison, and such efficacious medicines, as Antimony; however, when crude, it has no violent operation, and yet, taken in a proper quantity, may be given very advantageously in many cases, both to men and cattle. But if crude Antimony be melted in the fire, and mixed with the like quantity of nitre, by little and little it turns to a poison; and yet, if Antimony is mixed with one part of common falt, and calcined over a gentle fire for fome hours, continually firring it with a spatula, and afterwards eduleprating with water, there will remain an aft coloured powder, which has no violent operation, but will promote a gentle fweat. Moreover, if you take four parts of Antimony, and four of falt of tartar, and melt them, and then pour them into a cone proper for that purpose, you will have the medicinal regulus of Antimony, which may be beaten into a reddish powder of extraordinary virtue. But if, inflead of one part of the falt of tartar, two or three be made use of, and then melted, the regulus will be changed to a point. which is occasioned by its being deprived of too much white and hereaft. of its fulphur.

Crude Antimony, reduced to a fine powder, and taken inwardly, is very useful in several diseases; for it will dissolve the clamminess of the studies, open obstructions, and is a good remedy in diseases of the skip. It is also excellent against the rheumatism, and will take away numbness of the limbs. The dose is about half a drachm. Antimony is also useful to various artificers; for pewterers mix it with tin and lead to make their pewter shine, and to give it the sound of silver; bell-founders mix it with other metals in making their bells; likewise the letter-founders constantly employ

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126 Th NATURAL HISTORY

it in making their types. Add to this, that goldfmiths make use of it in purifying gold; for, when melted therewith, it will destroy all other metals, not except-

ing filver, and turn them into drofs.

BISMUTH is a semi-metal, which will melt in the fire, but is not ductile; it is heavy, brittle, and differs from lead and tin in its colour and hardness; for it fometimes looks like filver, and fometimes is of a faint purple colour, not unlike regulus of antimony, though it confifts of broader plates. Bismuth is sometimes found in so very pure an ore, that it stands in need of no other operation to fetch it out, than by breaking it in pieces. In the Museum of the Royal Society there are pieces of Bismuth sent from Corn-wal under various names, which are so very rich, that, if a piece of it be only held with a pair of tongs against a clear fire, the Bismuth will run down in the form of melted tin, almost as soon as cheese will drop in toasting. Some call the ore of Bismuth the cobalt of Bismuth; because it contains the same principles as real cobalt, only in a different proportion. It is by fome called tin-glass; and, when broken, appears to confift of small cubick particles, and these again of minute plates applied to each other. It is more brittle than zinc, though it differs little from it in external appearance, except in colour. It will cause metals, that will not easily melt, to be more fusible by a much less here than they otherwise would. It mixes easily with any metal, and, according to the greater or less quantity added thereto, it renders them more or less white and brittle. But as Bismuth is easily destroyed, its mixture with metals, difficult to be melted, should be made in close vessels. It is very observable, that Bismuth melted with lead, tin, or filver, and afterwards amalgamated with Mercury, will pass through leather in much greater quantities than they otherwise would. When this powder is washed it is very white, and used by the ladies as a beautifier of the skin. It is of little use in medicine.

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zinc is a femi-metal, of a blueish-white colour, brittle, and yet somewhat ductile and malleable, though much less so than metals. It melts in a gentle fire, after which WATERS, EARTHS, FOSSILS, and MINERALS. 129

which it smokes, and then slicks to the surnace in the form of exceeding white slowers. In a greater fire it burns, and emits a slame of a most beautiful green colour. All the Zinc that is prepared in Germany, especially at Gosslaer, is obtained by sublimation, and not by melting; nor is it got out of any single ore, but out of such a consused mixture of different ores, that several other metals and semi-metals may be separated therefrom at the same time. There is no particular kind of sublimation for the extracting of Zinc; for it is collected during the melting of other metals, especially lead. The ores that yield Zinc are, by long and repeated roastings, freed from sulphur, and in a manner from arsenick, by the same operation.

There are certain substances that may be more properly called ores of Zinc, such as lapis calaminaris, or calamine; as also native cadmia. This is of a very irregular figure, sometimes spongy, and now and then solid. It is sometimes of a gold colour, sometimes red, and at other times grey; or of the mixture of them all. It is not very heavy nor hard; and, when broken in pieces, it immediately emits a slame of a greenish colour, and exhales a white, thick, copious sume, of a smell peculiar to itself, which condenses into very light slowers, at first blueish, and then of a greyish white. But care must be taken that the calamine be not mixed with a yellow sulphureous pyrites, or the white arsenical one, nor yet with lead ore.

Zinc, by some called Spelter, and by others Tuttenag, mixes readily with lead and tin, rendering them more brittle and less malleable. When it is by sustion mixed with some times the quantity of copper, it becomes a brittle metal of a gold colour, which is well known by the name of Princes or Bath metal. The white slowers of Zinc, taken internally, promote sweating, and sometimes they will work upward and downward. The dose is from four grains to twelve. The making of Prince's metal is by melting three ounces of copper with half an ounce of Zinc, and when the mass is cold, it will appear of a fine gold colour, remaining ductile with a hammer.

COBALT is a penderous mineral finely streaked, or fometimes granulated. It is often smooth on the outside, of a light greyish, and almost semi-metallick colour, and sometimes of a dark blackish dye. It contains a great deal of arsenick, as well as a certain fixed earth, which being melted with slints, and fixed falts, turns into glass of a sine blue, called Smalt, which has been taken notice of before. Cobalt commonly contains bismuth; however, there are several minerals which go by the name of Cobalt, that have different properties from the former. That called the flower of Cobalt is sinely streaked, lighter than the foregoing, and of a sine red purple colour, and belongs to this class; for it is a very arsenical mineral, and loses one half of its weight in the fire; but a great deal of bismuth may afterwards be melted out of what remains. This will likewise give a blue colour to glass, like the other Cobalt.

Native CINNABAR is a fossile metallick substance, heavy, but not very hard, which is either sound pure, or mixed with stones. One of the sorts, when pure, is of a purple colour, inclining to red, and when ground, becomes of a beautiful red. There is another of a blackish, or of a liver colour, like blood-stone, and another yellowish. That sort of Cinnabar, which is mixed with stones, is often sound in a siffile ash-coloured stone, and sometimes in a very white metallick stone. It is sometimes met with under the form of pyrites, of a gold or silver colour. It is sound in various places, as in Carinthia, Hungary, Bo-

bemia, Italy, Spain and France.

It is known almost to every one, that it contains plenty of quick-silver, which is got from it by distillation, with the affistance of quick-lime or silings of iron. Sulphur may be extracted from it, though in a small quantity, if it be boiled in a strong lye, and separated from the quick-silver by pouring distilled vinegar thereon. Besides, Cinnabar may be made by art, not much unlike the native, as will be taken notice of hereafter. It is recommended by some physicians for internal use against the epilepsy, vertigo, madness, and disorders

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WATERS, EARTHS, FOSSILS, and MINERALS. 129

disorders of the head; but the native Cinnabar is now very little used, the factitious fort being preferred.

OUICK-SILVER, or MERCURY, is a metallick fluid substance, cold to the touch, of a shining filver colour, very heavy and volatile, and readily mixes with most other metals. It is either found fluid in the bowels of the earth, in the chinks and veins of mines from whence it is collected, and washed with plenty of water to separate it from the earth, or it is dug up in glebes, confisting of a red mineral, fulphureous, mercurial, substance, called cinnabar. It is also found in the form of a flimy or stony glebe of divers colours, it being fometimes red, yellowish, brown, or of a lead colour. From this last, Quick-filver may be obtained by fimple distillation, without the addition of any other matter, either by afcent in a retort, with a proper fire; or by descent, which is the common way. and is done in the following manner: They pound the mineral, and throw it into earthen vessels with a narrow neck, stopping it up with fresh moss from trees; then they place another over it, with a wider mouth, and bury them in the earth, with one of the mouths against the other, coating them all round with clay, and luting the mouths together, in fuch a manner, that the empty veffel is entirely hid under the earth, and that which is full placed above it. This is done in an open place, and many of them ranged in rows, after which they make fires all round them, by which means the minerals are heated, and the Quick-filver falls by drops into the lower veffel; but if the mineral abounds with sulphur, the Quick-filver cannot be extracted without the addition of fome other substance, such as quicklime and filings of iron, already taken notice of, as. also wood-ashes...

Quick-filver exceeds all other metals in weight, except gold; for that will fink therein, while others will make the top. The weight of gold, compared with Quick-filver, is a little more than four to three. It will mix with all metals, or femi-metals, though not without difficulty, with antimony, iron, and copper. It penetrates the metals, renders them brittle, and diffolves them; for which reason it is accounted by some

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the first matter of metals; but this opinion cannot be supported by experiments. It may be made to put on various appearances, which are all reducible to running Quick-filver again. It joins very readily with fea-falt, and turns therewith, by a gentle heat, into a white crystaline mass, called corrosive Mercury sublimate: but it will not do the same with nitre and vitriol. It will readily diffolve in spirit of nitre; but not without great difficulty with the oil of vitriol. It undergoes no change with alkaline falts; but it may be killed and fixed with falino-fulphureous bodies. Being ground fome time with fulphur, it will turn into a very black powder, called Æthiops mineral; which, by the affiftance of fire, may be fublimated into a very red radiated fhining mass. Quick-silver being dissolved in spirit of nitre, and the acid spirit exhaled by fire, a red powder will remain at the bottom, called red precipitate; but if it be precipitated with falt of tartar, a brown powder will fall to the bottom, named precipitate of Wurtz; but with sea falt it will be white, and with lime water yellow.

The analysis of Quick-silver is very difficult, because it frequently slies away with the heat of the fire; however, if it be exposed to that heat in a glass vessel, with a long neck, it will, at length, become a grey powder, then yellow, and, at last, red; at which time it is somewhat more heavy than when sluid. But if this be exposed to a more violent heat, it will sly away, leaving only a little brown earth behind it.

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Quick-filver, by the ancients, was accounted a poilon, and Avicenna was the first who ventured to use it externally; but upwards of two hundred years ago some had the courage to use it internally, because they observed that it did sheep no harm, when it was given them by their shepherds to kill their worms. But Quick-filver cannot be said to have no bad effects for those that are employed in digging for it, seldon continue four years without being affected with a trembling of the limbs and a pally, of which they die.

However, Quick filver has a remarkable virtue opening all obstructions of the vessels and glands, an of dissolving the thick gross matter contained therein

WATERS, EARTHS, FOSSILS and MINERALS. 131

for which reason it is given in schirrosities of the liverspleen, and mesentery, as well as in obstructions of
the glands, and will also temperate the acrimony of
the blood and humours. Quick-silver, not only taken
inwardly, but applied outwardly in an ointment, will
purge the body by stool, sweat and insensible perspiration; but its most remarkable effect is that of salivation.

That Quick-filver is counted best that is of a shining filver colour, very fluid, and, when held over the fire: in a filver spoon, will fly away, without leaving any thing behind it. That which is of a livid colour, and does not separate into drops that are exactly round, is naught, and flews that it has been adulterated with lead or bismuth. However, it ought always to be cleansed, which may be done by squeezing it through fhammy leather; but the best way is to distil it in a retort with quick-lime, pot-ashes, or iron filings. Crude Quick-filver may be given to kill worms, from a scruple to a dram; and it may be rubbed on glass with sugar till it is diffolved, if a drop or two of oil of sweet almonds be added thereto. A pound of Quick-filver may be also boiled in pure water for an hour, and some of the clear liquor given to children for their common drink. It will kill worms taken inwardly and lice when applied outwardly with an ointment. Crude Quick-filver is fometimes given to the quantity of two or three pound, with oil, to force a passage through the guts in the iliack passion.

LEAD is of the least value of all metals, it being heavy, livid, and fouls the hand with a blackish colour; it yields little or no found, and melts quickly in the fire before it turns red. Pure Lead is seldom found in the mines, but is extracted from ores of different kinds; for it is sometimes black, blue, yellow, or of an ash colour. It is sometimes full of shining minute particles, and sometimes again it is like a stone of a leaden shining colour, consisting of squares like dice, that lie in a white or reddish stone. The ore of Lead almost always contains a small quantity of silver; and particularly that of Cardiganshire in Wales has so much of it, that from two thousand pounds

weight

132 The NATURAL HISTORY of

weight of ore, there has fometimes been extracted

twenty pounds of filver.

When flints and the like are mixed with an all or black colour, or are only marked here and there with veins and spots of the same, it is a sign that they contain either Iron or Lead. The green Lead ore is very rare; but when it is found it is variegated with a yellowish green colour and semi-transparent. It is likewise heavy but not hard, and one hundred weight of it yields from seventy to eighty pounds of Lead. There is also white and ash-coloured Lead ore, but it is as uncommon as this.

There are several mines of Lead in Spain, Italy and Germany; nor is France without, though the metal be extracted with difficulty; but the best and richest are in England and Scotland. The method of obtaining the metal, is by placing the ore between strata of coals, and then when the fire is kindled the metal will flow; or pieces of wood may be used instead of coals or mixed therewith, according to the degree of fire that is required; for coals yield a more violent fire than wood.

The weight of Lead compared to Gold is as three to five. Lead is eafily calcined and reduced to an afhcoloured calx, which in a more violent fire turns yellow, and at length red, when it is called minium, or red lead, which may be easily reduced to Lead again, when mixed with combostible matter and melted. Lead mixed with nitre in a crucible will flath a little, and if the filings of Lead be thrown into the flame of a candle, it will tinge it with a blueish colour. From whence it appears, that there is a sulphurcous principle in Lead, though in a small quantity. When Lead is exposed to the focus of a large burning-glass, it will immediately fmoke, and by little and little change into an afh-coloured calx, then yellow and red, afterwards turning to a faffron coloured fluid, like oil, which in time will fly away in smoke; but if this fluid, before it is quite diffipated, be taken away from the focus, after it is cold, it will turn into a red, or reddiff yellow mass, confisting of thin plates like orpiment, which are transparent and look like

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Talc. But if this be applied to the focus of a large burning-glass, upon coals, it will immediately melt. and turn to Lead again. From hence it appears, that Lead confifts of a glaffy earth, not much unlike Tale with a fulphureous principle, that is inflammable, and

not mixed intimately with the earth.

Lead will distolve all other metals, except gold and filver, and carry them off along with it, or turn into litharge or fly off in smoke; for this reason it is used for the purifying gold and filver. It will not rust in water like iron or copper, but will distolve in vinegar, spirit of vitriol, and spirit of nitre; and the falt which is obtained therefrom, when the fpirits are evaporated, will have a sweetish taste; whence it is called fugar of Lead. It will also dissolve in oil and all fat substances. When Lead is reduced into a calx, though it emits a copious smoke, and loses much of its fubflance, it will increase in weight, infomuch, that an hundred pounds of Lead will increase to an hundred and ten, when it is converted into red Lead; but if this afterwards be reduced to Lead again, it will not yield near an hundred pounds. When red Lead is melted with fand, it obtains a vellow gloss, not much unlike amber. Several preparations of Lead have formerly been used as medicines : but, as it is an enemy to the nerves, it is in a great measure left off, and ought to be entirely abandoned.

Litharge is generally made in the furnaces of metals. when Lead is separated from filver, or when Lead is made use of to cleanse filver from other metals mixed therewith; and it sometimes is of a filver, and sometimes of a gold colour, whence it is called litharge of gold or filver, though it does not receive its colour from those metals. Litharge is of great use in making plaisters of which it is the basis, being mixed with oil. It is a moderate drier, cleanses with a littleaftringency, and is proper to bring ulcers to a cicatrix.

Cerufs, or white Lead, is a fort of ruft of Lead prepared in the following manner: The sharpest vinegar. must be put into wide mouthed vessels in the summertime, over which a place of Lead is to be placed for

134 The NATURAL HISTORY

closely, that nothing can escape out of the vessel: In about ten days the plate will be dissolved, and fall to the bottom of the vessel, from whence it is to be taken and dried, and afterwards ground in a mill. It is also made from the filings of Lead put into very sharp vinegar for ten days together; or a plate of Lead may be put therein, and taken out from time to time to scrape off the white part; and so again and again, till the whole plate is dissolved; then all the scrapings may be collected, ground, and made into masses

with vinegar.

TIN is one of the foster and more ignoble metals; and is white, shining, brittle, sonorous, and crackles when bent. It is the lightest of all metals, and never existed naturally in a true metallick form. The richest Tin ore is of a black or dark colour, with many sides of an irregular figure, and a glossy surface. It is heavier than the ores of all other metals, which is somewhat strange, because Tin is lighter than all the rest. It is indisferently hard, and bears a quick fire without melting or growing clammy. But the most common Tin ore is of a dark, yellowish, rusty colour, and is very like the ore of iron; it is like the former in shape, and seems only to differ from it in its degree of purity. The garnet is a fort of precious stone, and now and then contains Tin; so that, upon this account, it is reckoned among the ores of this metal.

Tin, in Cornwal, is extracted from its ore, after it is separated from the stone to which it is connected, by pounding it with iron peftles, and in the mean while it is continually washed with water, that the earthy parts may be carried away therewith, and that the metallick particles may fink to the bottom. This gross powder, after it is dried, is ground with stone mills, and then washed, till it is quite freed from all foreign matter. Then it is dried and thrown into 2 furnace, mixed with charcoal, which being lighted and blown with bellows, the Tin will melt and fall to the bottom of the furnace; when the workmen, opening the small door of the furnace, suffer the metal to run into fand prepared for that purpose, where it forms large masses. The upper part of the Tin is for foft.

Page 134

Rough Diamond





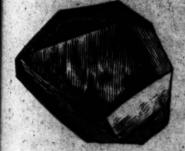
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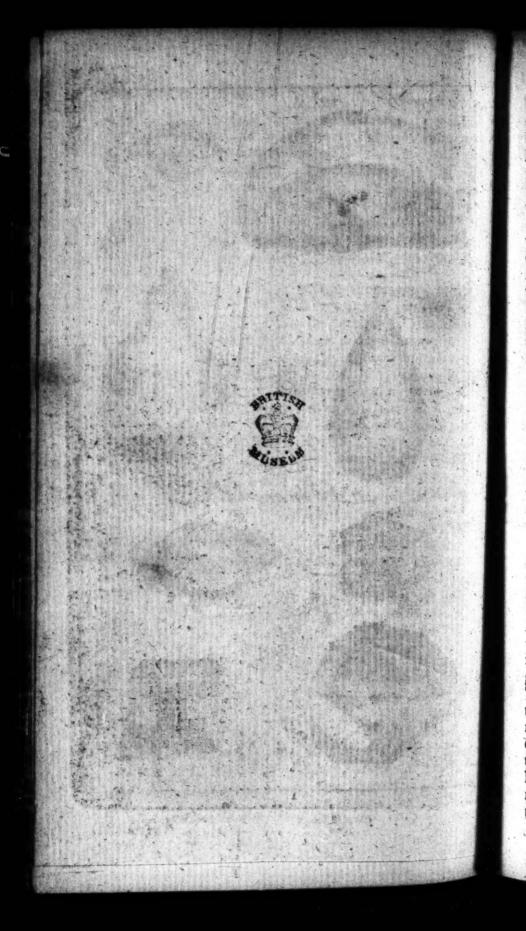








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WATERS, BARTHS, FOSSILS, and MINERALS. 130

foft, that it is not fit for use without copper; and therefore they mix three pounds of that metal with an hundred of Tin. The middle part only requires two pounds of copper; but the lowest is so brittle, and so unfit for use, that they mix eighteen pounds of Lead with an hundred of Tin.

There is often an arfenical substance mixed therewith, which they call mundick, that is of a shining dark colour, and blackens the hands; but, by the help of fire, it flies away in smoke. There is also another white faponaceous substance, which is foft, and may be diffolved in water at first; but foon after turns very hard. It is a kind of marl, The weight of Tin. with regard to gold, is as three to eight; and is eafily melted and reduced into a whitish calx.

Tin will melt sooner than other metals, and will adhere to them very readily; for which reason copper and iron vessels are often tinned on the inside, to hinder them from rusting, and to prevent the bad effects of the copper. If it be mixed with these metals, it renders them more hard and brittle, and cannot be feparated from them without great difficulty. Tin will not diffolve in any spirit, unless it be aqua regia; and its folution will tinge gold with an elegant purple

colour.

The virtues of Tin are now well known as a vermifuge; for it will kill worms, taken either in powder or filings, from a scruple to a dram for several days. Salt of Tin is made of that metal reduced to a calx. by exposing it to a reverbatory fire for two or three hours, and then throwing it into very firong diffilled vinegar. This is recommended in hyflerick fits, and is given from two grains to fix. Mosaick, or musive. gold is made in the following manner: take of fine Tin one ounce, of Mercury revived from cinnabar ten drams, and make an amalgama, which must be mixed with ten drams of common fulphur, and an ounce of fal-ammoniack. All thefe, being finely ground together, must be sublimed in a strong are for four hours, and a fort of of cinnabarine substance will be raised to the upper part of the vessel; but at the bottom a kind of spungy substance of a gold colour will remain.

136 TH NATURAL HISTORY OF

remain, which being washed in several waters, is called musive gold. It is of great use to painters, and in medicine has a diaphoretic quality. It is accounted good in hysteric and hypochondriack disorders, as well as for killing of worms. The dose is from tengrains to thirty. Some have supposed this to be a mercurial preparation, but falsely; for all the mer-

cury is raised from it in sublimation.

IRON is an ignoble metal, remarkable for its hardness, and is of a whitish livid colour when polished;
but before that it is blackish. When it is cleansed
it is called steel. The ore of common Iron is of no
certain form; but is most commonly of a rusty colour.
There is also an ore which is very heavy, and of
a red blueish colour when broken. It is very rich
in the best kind of Iron, and usually yields at the
first melting, from sixty to eighty pounds out of an
hundred weight. There is also a singular kind of
Iron ore, of a pale yellowish colour, though sometimes grey; and sometimes of a kind of semi-transparent white. It will yield, when melted, about
thirty pounds of Iron out of an hundred weight.

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The HAMATITES, or Blood-stone, is also a fort of Iron ore, and is very smooth on the outside, when the ruft is taken off; but the infide is composed of convergent Areaks. It is of a dark red colour, very heavy and hard, and is one of the pureft of the Iron ores, with a small mixture of arsenick. Smiris, called in English emery, is the hardest of all the Iron ores hitherto known, and is almost as heavy as the blood-Rone. It is of a brown colour, and certainly contains Fron, though it is not worth while to employ it for that purpole; and therefore it is used by workmen, when pounded, to polish steel and other things. Magnesia, or Magnanese, has no certain figure, is of a greyish black colour, and contains Iron; but it is not worth while to make use of it on that account, because it will not answer the charges. It is used in glass-houses to take away the green or blue colour of

When iron is melted, it is formed into large masses, which are long and thick, and commonly called pigo.

These

Thefer are melted over again, and ftirred with an fron rod, in order to render them malleable. While they are yet red hot, they are placed under hammers, and by that means the heterogeneous particles are forced away by the repeated flrokes. One fort of Iron differs greatly from another; but that which is toughest is best; and that which is most brittle is worst of all However, all forts of Iron are of the same nature; and they are only more or lefs tough in proportion to the earthy, vitriolick, and fulphureous particles mixed therewith. Iron being often melted and cleanfed is turned into feel; though, in fome, little labour is required for that purpose, and in others a great deal. When Iron is very good, they melt it in a furnace, and throw in gradually a mixture of equal parts of an alkalious falt, and filings of lead, with the rafpings of oxes horns; then they ftir the melted metal, and at length place it on the anvil, where they beat it into rods. Some Iron will not melt over again, and then they take Iron rods as thick as a man's finger, and place them in a proper earthen vessel, alternately with firata composed of equal parts of soot, powder of charcoal, and raspings of oxes horns. When the vesfel is full, they put a cover over it, and lute the joints, placing it in a reverberatory furnace; the fire is kindled, and increased by degrees, till the vessel is hot, and after fix or feven hours, they let it go out of itself, in which time the rods will be turned into feel. When this operation is not perfectly performed. and only the outfide of the Iron is turned into ficel, in some parts of England, it is called case-hardening, and this is commonly done with the leather of old shoes.

Iron is the hardest of all metals; but it will become harder still, if heated red hot and quenched immediately in cold water. The weight of Iron when compared with gold is as three to seven. Iron may be converted into rust, by moistening it with water, letting it dry, and often repeating the same operation; but it may be preserved from rust by being smeared with sat. Iron, calcined in a reverberatory sire, will turn into a darkish red, or purple calx; but being heated

heated fo hot as to be ready to melt, it will turn into fcales under the hammer, which is nothing elfe but Iron half turned into glass. That part of the Iron, which in furnaces is turned into a fort of gloffy froth, is called the drofs of Iron. This metal will dissolve in all forts of acids; but alkalious Salts will not touch it. was an advert flower at the way rest being the

Iron is a most useful metal, not only on account of the various mechanical uses it is put to, but on account of the many medicines it yields. Iron has two remarkable effects, namely, that of opening and binding; for it opens the obstructions of the liver, spleen, and bowels, stops loofenesses and hamorrhages, and restores relaxed fibres to their due tone. For medicinal purposes, Iron is better than steel; and the filings of Iron alone, when ground small, is better than any other preparation of this metal whatever. The dole is from twelve grains to half a drachm, once or twice a day, in the form of a bolus, pills, or lozenges.

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COPPER is one of the more hard ignoble metals, is fofter than iron, and, when polished, is of a shining reddish colour. It will melt in the fire, and is so ductile that it may be beaten into exceeding thin leaves, It is more frequently found in its metallick form than iron, in various shapes; but its ore never distinguishes ittelf by any certain figure, for it is almost always irregular. But the finest colours of any kind, except the red and transparent, most commonly betray the prefence of Copper; for this reason there is hardly any Copper ore that is not mixed with Iron in a larger quantity than the ores of other metals commonly are However, there is not fo much in some as in others, and those that contain the least Iron are naturally more easily melted than the rest. The vitrious Copper ore is of a darkish violet sky-colour, like that of a piece of fleel that has touched a red hot iron. It is very heavy, and of a moderate hardness; but it is commonly variegated here and there with spots and grey veins. One hundred weight of this contains from fifty to eighty pounds of Copper. The Azure Copper ore is of a most beautiful blue colour, and is not foft, but very heavy, and when broken shines like

WATERS, EARTHS, FOSSILS and MINERALS. 130

blue glass. This is most free from iron, arienick, and fulphur; and a great quantity of excellent Copper may be extracted out of it with very great eafe. The Green Copper ore is like green crystals, and sometimes very prettily fireaked; but in other things it has the properties of the former. The light dusky blue concretes, as well as the green, called by fome Copper okers, yield a great deal of very good Copper when they are pure, which may be known from their colour and weight; but those that are more light are mixed with unmetallick earth, and those that are yellow contain iron oker; on which account they are the more difficult to be met with, and yield less Copper of an inferior fort.

The white Copper ore has been hitherto found only in one fingle mine of Misnia, and is diffinguished from the white pyrites by a somewhat yellowish co-

The Sulphureous Copper pyrites is of a yellowish gold colour, with a light tinge of green, both within and without. When broken, the infide has a kind of granulated furface, and is easily beaten into powder. It contains fulphur and Copper in many different proportions; on which account its specific weight varies very much. If it is very rich in Copper, and at the same time is mixed with any quantity of arsenick, its gold colour becomes more yellow, and when it is broken, the furfaces are more smooth, neat and even. It is very often of a fine bright green, and blue on the outfide, and between the chinks, though when, broken, it appears of a different colour. When the Copper pyrites is mixed with a confiderable quantity of arfenick, it will then look pale like the fulphureous Copper pyrites, and still whiter when there is more arienick. However, it may be eafily diffinguished from the iron pyrites in being more heavy, and in not sparkling so easily when struck with a steel. The yellow fulphureous iron pyrites belongs to this class, because it often contains a great deal of Copper, which may be known from its not being of a globular igure; for, when it is in that form, it is always deftithe state of the property of the state of th

tute of Copper. There is likewife an unufual yellowish

colour throughout its whole substance.

Copper is feldom found alone in its ore, for there are other metals along with it, as filver, iron, and lead; there is also a large quantity, generally speaking, of a combustible sulphur, not easily separated from it. That which abounds with most sulphur, must undergo different calcinations till all the sulphur is exhaled, and this the workmen call roasting. After this, the roasted ore is beaten into smaller pieces and calcined again, then it is beaten very small, and must undergo a third roasting, after which it will melt into a stony red substance, which is called the stone of Copper. This done it must be roasted again, and then melted, when it will yield a black Copper. It must yet be roasted eight times, and then it will be thoroughly cleansed from all the sulphur.

There is a fort of Copper springs, out of which witriol is made by boiling, and Copper may be extracted by precipitation, with the assistance of iron. There is one of this kind found near the town, called Smalnick, not far from mount Krapack in Hungary, in which there is Copper that will stick to iron when thrown into it; thus for instance, if you throw a horse-shoe into this spring, after a few days it may be taken out covered all over with Copper. There are Copper mines in various parts of the world, but the

best and richest are in Saveden and Germany.

The weight of copper, with respect to gold, is a little more than sour to nine; and if it be exposed to a moist air, it will contract a green rust. It has a disagreeable smell, and an austere acrid nauseous taste; it will, in time, dissolve in water, as well as in oil, and salts of all kinds will corrode it. Copper contains a portion of combustible sulphur, though not so much as iron, with a metallick red earth that will turn into glass. Copper will turn white with the sumes of arsenick or quicksilver; but it will not continue long. Being melted with lapis caliminaris, or zinc, it will turn of a yellow or gold colour, which is called Brass. Copper, on account of its ductility, is formed into various houshold utensils, and is melted into mor-

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Waters, Earths, Possies and Minerals. 141

tars, great guns, and the like; but it is feldom used in physick, especially internally, because it is of a poisonous nature; for which reason it is not safe to use it in pots, kettles, and the like, without tinning.

Verdigrease is the principal preparation, and is of great use to painters and dyers; but it is seldom or never given inwardly by physicians, though it is fre-

quently used externally.

SILVER is a noble and perfect metal, of a white thining colour, fonorous and ductile, but not fo perfect as gold. It is fometimes found in small matter of many different thapes, but most commonly like filaments and scales in feveral forts of stones and earths,

and in many forts of land,

The Vitrean Silver ore is of an irregular and uncertain form, is very weighty, and may be eafily flatted with a hammer; for it is not much harder than lead, and is much of the fame colour; for which reafon it is often mistaken for lead. It melts prefently, and foon grows red-hot. It confifts of fulphur, and pure Silver, and above three quarters of it is Silver. The Horny Silver ore is half transparent, and is of a deeper yellow or brown colour, according as it confifts of larger or smaller lumps. It looks like rosin, and is of an irregular shape. When carefully examined, it appears to confift of very thin plates; it is not very weighty or hard, for it may be eatily ground; and when brought fuddenly to the fire, it crackles, burits, and exhales a fulphureous finell, and tometimes burns lightly. This hard fort contains two thirds of Silver. The red Silver ore is fometimes of a lighter, and fometimes of a deeper fearlet colour; the first case is transparent like a garnet, and has been mistaken for transparent cinnabar; and in the second case it is of a deeper dye. It is heavier than the former horny ore, but burits when brought near a candle or a mild fire, and the remaining part melts before it grows red-hot; then it emits a difagreeable fmell of arfenick, together with a thick smoke. It contains the same quantity of Silver as the horny ore just mentioned.

142 The NATURAL HISTORY of

The White Silver ore is of a light grey colour of an irregular figure, pretty weighty, and very brittle. It has not only copper in it, but sometimes more of it than of Silver; for it differs from the white copper ore in nothing but in the quantity of Silver it contains, These are the principal Silver ores hitherto known. though many others are looked upon, by fome, as fuch, because they contain a confiderable quantity of Silver; but then there is always more of other metals along with them, and therefore they cannot properly be called Silver ores.

There are mines of Silver in many countries, as in Italy, Germany, Hungary, Norway and England; but the most remarkable are those of Peru and Mexico. In England the veins of lead always contain a small quantity of Silver, particularly that in Cardigansbire. Silver may be easily extracted from lead, by melting it in channels, made with ashes in the furnace, and then blowing up the fire with bellows, till it turns into glass, finks into the channels, and leaves the pure Silver behind.

Silver is harder than gold, but not fo ductile, and is lighter than gold or lead, the weight, with regard to gold, being little less than five to nine. It will not ruft, but will grow black by fulphureous vapours, and will dissolve in aqua fortis, but not in aqua regia. When it is mixed with common falt, and melted, it turns into a half transparent mass like horn, which is hard to be brought back to Silver again, because it is volatile, and in a violent fire will all fy away. When Silver is dissolved in aqua fortis it may be crystalized; and the crystals are very corrosive, and of an exceeding bitter tafte; when applied to the ikin, they leave an impression like that of a burning coal, and make an escar of a black colour. The folution of Silver will turn any thing black, and therefore, when properly diluted, is often used to colour the hair These crystals will melt in a very moderate heat before they grow red, and form a blackish mass; it is the proper for the use of surgeons, and is called the Silve caustick.

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GOLD, the heaviest and most noble of all metals. is extremely ductile, and of a thining yellow. It is often found native, as it is talled, but of no diffinct figure, confifting only of small irregular masses. But there is a flint, in which Gold is commonly contained in very large folid masses. It is likewise concealed. but not so often, nor in so large a quantity, in a yellow and blue fort of stone, which some call the horny stone. Lapis Lazuli is a blue stone, and is often very elegantly variegated with very small specks of Gold; however, the quantity is not fo large as in the former. Many forts of gravels and earths often contain Gold; but they are feldom rich enough to pay the charges of extracting it. However, that kind of gravel, which is found in the channels of rivers and brooks, especially when they wind and turn very much, is richer in Gold than the reft. It has been found in the rivers of Scotland, of which medals have been made, especially at the time of the coronation of king Charles I.

Native Gold is not always found pure, for it is often mixed with filver; and there has been no ore hitherto found, in which Gold constituted the greatest metallick part; so that no ore whatever can be properly called gold ore. However, there are Gold mines in Norway, Hungary and Guinea; but the richest of all are in Mexico and Peru. It is extracted from the substances in which it is contained, by roasting, pounding, washing,

and mixing them with quick-filver.

Gold is not only the heaviest of all metals, but of all other substances yet known. It will not change with common fire, nor will it say away in the focus of a large burning-glass, till it has continued there a long while. It will not rust, nor will it dissolve in any other menstruum, except aqua regia. It will mix readily with quick-silver, and turn into a soft amalgama. It may be calcined with common sulphur when it is made glowing hot, and held thereto. When Gold is dissolved in aqua regia, and oil of tartar poured thereon, it will precipitate into a brown powder, which if heated at the fire, or lightly ground, will say up with a great explosion and noise, from whence it is called sulminating Gold. All attempts

14 The NATURAL HISTORY of

to analyze this metal have hitherto been in vain. As for the use of gold in physick, notwithstanding the boasting of former chemists, it is little or none at all; for all its preparations have been hitherto found rather noxions than otherwise.

MARIAN MARIAN

CHAP. XXI.

Of GEMS of all kinds.

F all the Transparent Gems, the DIAMOND is the hardest, the most beautiful and valuable. The best are those that are void of all colour; for if they are tinged with white, yellow or black, they are in some degree faulty, and confiderably lower in price. It may be readily diffinguished from all other Gems by its extreme luftre and sparkling, as well as the brightness of its reflections. If a little burnt ivory be laid upon mastick, in such a manner as to render it black, and the diamond be laid upon it, it will then reflect the most lively colours every way, which is a property belonging to this Gem, as all others will not bear the like trial; for, when they are laid upon the mastick in this manner, they either resect no colours at all, or, if they do, they feem to be feen through a mist. There have been jewellers, who, defigning to make other stones appear like diamonds, have taken a grain of wheat, and have preffed the oil out of it with a hot iron, and then have mixed it with lamp-black, or burnt ivory; then put it under the stone, but so as to leave a little room between it and the black tincture. Then the transparency, which is partly owing to the stone, and partly to the air, causes it in some degree to resemble a true diamond, infomuch that some, though skilful in these matters, have been deceived thereby.

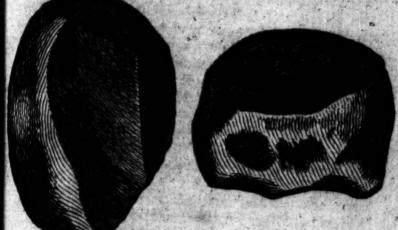
Those Gems that are most proper to counterfeit diamonds are the saphire, the oriental amethist, the topaz, and the chrysolite, because they are all hard, transparent, and may be deprived of their colour by means of fire; but this is most commonly done with quick lime, or the filings of steel; for when the Gem

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Page 144

Rough Diamonds





Polished Diamonds





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is coa and Wh fire till priv fore hot, tain more beer diffination of the formation and the formation and the formation of the formation is buried in these, and put into a crucible with charcoal, it is put over the fire, and gently heated at sirst,
and when the heat is encreased the colour will vanish.
When it has been in a sufficient time, they let the
fire out by degrees, and do not take the stone out
till it becomes lukewarm. If it is not entirely deprived of its colour, they repeat the operation as before; for if it was to be heated suddenly, or, when
hot, immediately exposed to the cold air, it would certainly crack, or perhaps break entirely. A topaz is
more fit for this purpose than an amethist, for this has
been managed so artfully, that it could scarcely be
distinguished from a diamond by the best judges.

Diamonds fometimes receive their names from the places where they are found, as the Hungarian, Bobemian, and the like. Among these there are two differences worth observation; for some are found in the form of hexagons, and others almost round; but they differ greatly in hardness: those that have angles are fofter, and are little better than crystal, as the Hungarian; those that are round, and in some sense refemble flints, are by much the hardest, and come pretty near the luftre and sparkling of oriental diamonds: but as they will not stand the trial of the mastick above-mentioned, they cannot properly be called diamonds. The oriental diamonds are distinguished by the name of the places where they are found, for some of these are denominated from the old mines, and others from the new. However, they are not all equally hard, nor of the fame colour, but they will stand the test of the mastick; and the harder they are the more they sparkle. Diamonds are not weighed like gold, but by carats, each carat confifting of four grains; and it has been faid, that there was one found in Bisnagar that weighed an hundred and forty carats, that is, five hundred and fixty grains; it has also been reported, there was one met with that weighed two hundred and fifty carats, and was of the fire of a puller's egg: However, the largest now known in Europe, is one that belongs to the great take of Tuscany, which weighs an hundred thirty line carats and a half; and that in the possession of VOL. V.

the French king, which is equal to an hundred and fix carats.

Diamonds are of such a nature that no fire will injure them, for when they have remained in one for several days, they rather come out with a more perfect lustre than otherwise.

The value of a diamond arises partly from its sparkling and reflections, for it will imitate all the colours of the rainbow; and partly from its hardness, from whence it may be said to be almost incorruptible. Diamonds were formerly worn by kings, and other great persons only; but now they are very common, and may be easily purchased by people in moderate circumstances. A well polished Diamond formerly, of the weight of a pepper-corn, was fold for fifty shillings, but now it is not worth above two. A cut Diamond, weighing a carat, or four grains, has been valued at upwards of ten pounds; but now the price is extremely sallen.

With regard to the use of a Diamond, it not only serves for ornament, but, when reduced to powder, is extremely serviceable for polishing and cutting all other Gems whatever; and it is well known, that Diamonds themselves cannot be properly polished without it.

A Diamond seems to consist of several plates, laid one against another; for which reason, a skilful lapidary, with the point of a knife, can divide one into two or more tables. If one be placed in the focus of a burning-glass, with its plates perpendicular to the rays of the sun, it will receive no detriment; but if it be turned the other way, the rays will get between the plates, divide them, and afterwards turn them into a glassy substance, leaving not the least sign of the splendor of a Diamond.

The places from which Diamonds are brought, are the island of Borneo, and the kingdoms of Visapour, Golconda, and Bengal, in the East-Indies, as well as from Brafil, in South America.

for the fake of Diamonds, visited the places where they are chiefly to be found, in order to get the best knowledge

Page 146

Diamonds

















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WATERS, EARTHS, Possils, and Minerals. 147

knowledge of them he could. The first mine that he faw, was at a place called Carnatica, in the dominions of the king of Visapour, and at a place called Raolconda, five days journey from Golconda. This was found out above three hundred years ago; and about the place where the Diamonds are met with, the ground is fandy, and full of rocks and low trees. In these rocks there are several veins, sometimes half an inch, and fometimes an inch broad. The miners have small pieces of iron, crooked at the end, which they thrust into the veins to draw out the fand or the earth, which they put into vessels; and it is among this earth they find the Diamonds. But as these veins are not always ftraight, but fometimes ascend, and fometimes descend, they are obliged to break the rock to follow the course of the veins. After they have opened, and gathered as much fand as they can out of the veins, they wash it two or three times, in order to discover whether there are any Diamonds among it or not. This mine yields Diamonds of a very fine water; but they are often flawed by the bad management of their hammers in breaking the rocks to pieces. If the Diamond is good, they only polish the surface a little, because they are afraid of bringing it to a proper form that would lessen its weight. But if there be the least slaw or foulness, they give it variety of faces, or fides, in order to hide the defect. However, it is observable, that they would rather see a black speck in a stone than a red; and therefore, when there is one that is red, they put it into the fire, and then it becomes black. There are feveral men here, whose employment is to polish the Diamonds, and they have each but one wheel, which is made of feel, and about the diameter of a pewter plate. They apply but one stone at a time to the wheel, and fprinkle it constantly with water, till they have found out the way in which it will best work. This being found, they take oil and the powder of Diamond, which they never spare, because it is cheap here, that they may polish the Diamond the sooner. There is always a little boy, who continually supplies the wheel with oil and powder of Diamonds. However, they H 2 cannot

cannot polish the stones so well as the lapidaries in Europe, because as it is necessary to keep the steel rough by applying emery, or by filing it, and they are too lazy to do it fo often as they ought, confequently the wheel will not perform the work to well. nor fo foon, as those in this part of the world, where

they take more pains.

The CARBUNCLE is a stone of a very deep red. with a mixture of fcarlet, and has been formerly thought to shine in the dark like a lighted coal; but this is now known to be otherwise. It is said to be as hard as a faphire, and to be found naturally of an angular figure, or fmaller at one end than the other. However, as it is very uncommon, there needs no

more to be faid about it.

The RUBY is a transparent gem, of a reddish colour, with a small portion of blue, and cannot be touched by a file. The redness is not like that of vermillion, but of blood, or rather of cochineal, or kermes; but the less blue it has in it, the better it is. There are commonly faid to be four kinds, the Rubycell, the Balas, and Spinel Ruby, which with the true Ruby make up the number; and the best are found in the island of Ceylon. In Pegu they are found in a river of that name, and the inhabitants try their goodness with their teeth and tongue; for they judge those that are coldest and hardest to be the best. They are faid to mend the colour by the affiftance of fire. They are usually met with in a stony matrix of a rose colour, and if they meet with one that is transparent, they then call it a Balas Ruby; but if it is otherwise, and has no refemblance of a gem, it is then the true matrix of Rubies, because it is formed, nourished, and increased therein. At first it is whitish, and asfumes a red colour, as it ripens. It is generally found in the same mines with saphires, and some of them are pretty large; for the Emperor Rodolphus had one that was as large as a small pullet's egg, and this was thought to be the largest that ever was seen in Europe.

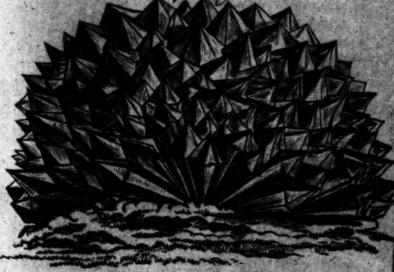
When the value of a Ruby exceeds ten carats, it is thought to be very great, and is not exceeded by a Diamond. When a Ruby is deficient in its colour,

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WATERS, EARTHS, FOSSILS and MINERALS. 149

that is, when it is not so red as it ought to be, some lapidaries endeavour to mend it, by putting a red soil under it, or glass of a beautiful red colour. Some have attempted to counterfeit a Ruby, with stones of a whitish colour, as a white saphire, topaz, or crystal, by the assistance of a red soil, for then it will sparkle and seem to differ very little from a true Ruby; however, those that have judgment in stones will very easily distinguish it. There are other methods of counterseiting this Gem, which we shall here omit.

The BALAS RUBY is the matrix of the true Ruby before described, and is supposed to have its name, from its being the house or palace thereof, for by some authors it is called palas on that account. This Ruby is of the colour of crimson, for it has a very little mixture of blue, and when it is polished, it is a very agreeable gem, and will sparkle almost as much as a true Ruby. It is found in veins of saphire, and is to be met with in the same places as the other; though it is not so valuable by far. It may be adulterated like the true Ruby, and the fraud will not be so easily discovered.

The SPINEL RUBY is of a deeper colour than the true, but it has not the splendor, for which reason it is more easily adulterated. However, there are some so good as to come very near the value of the true Ruby, especially those that are said to be of the old rock, and are about half the value of Diamonds.

The RUBYCELL is a gem that feems to be between the Spinel and the Hyacinth, infomuch that it is hard to fay to which class it properly belongs. Likewise, they are sometimes exceedingly like Bobenian Garnets, and are not known from them till an experiment is made in the fire; for these will bear it without the least loss of colour, whereas the Rubycell will either lose or change it. They are not near so valuable as the Balas or Spinel.

The GARNETS have by some been taken to be carbuncles; for, when exposed to the sun, they will shine like a lighted coal, and much better than a ruby. They are brought from the East and West Indies, and from Ethiopia, where they are of three kinds;

H 3

150 The NATURAL HISTORY of

for some are darker than the reft, being of a blackish blood colour, and yet they will sparkle indifferently well. When a white foil is placed under them, they are of fuch a fiery colour, that fome have mistaken them for true carbuncles. Many of these are large, some having been found bigger than a hen's egg. Another fort is of the colour of a hyacinth, and, if it was not for being redder, might be taken for a true gem of that kind. When it has a yellowish tinge, it may be placed among the class of hyacinths, and will be that stone called in Italy Jacintha la Bella. These fometimes refemble other gems fo much, that even the lapidaries themselves are not certain what they are. Another fort of Garnets are of a violet colour mixed with red, and these are better than the former, infomuch, that they are called by the Italians Rock-Rubies.

The OCCIDENTAL GARNETS are often of a fainter colour, and particularly the Spanish, insomuch, that they appear like a pomegranate feed, and are pretty large. Some are of a yellowish red, and will not change in the fire, particularly the Bohemian, and they are all free from flaws. These are more valuable than the oriental, on account of their refifting fire, and refemble real carbuncles. These are found in the fields almost every where by the country people, without any matrix; they are generally of the fize of peas, and are carried to Prague to be fold. At first they are so black on the outside, that no redness can be perceived, till they are held up to the light. Others are found in Silefia, but these are rough, and generally full of flaws, infomuch, that they are feldom transparent. If a Garnet be exposed to the focus of a large burning-glass, upon charcoal, it will be reduced to a metallick mass of the nature of iron, for it may be attracted by a loadstone.

The HYACINTH is so called, from its being of the colour of a flower of that name, which is of a yellowish red. There are four kinds, as being of so many different colours; the first is as red as vermillion, and pretty nearly resembles Bohemian Garnets, but without any mixture of blackness. These are

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more valuable than the reft, and may be placed in the class of carbuncles. The second fort are of a reddiff faffron colour; the third are like yellow amber, and could not be diftinguished from it, unless by their hardness, and their want of electricity. These are of little value, no more than the fourth fort, which look like white amber, and are worft of all. The Hys acinth is found in the East and West Indies, as well as

in Silefia and Bobemia.

The AMETHIST is a transparent gem, of a violet colour, arising from a mixture of red and blue. However, they are of different colours, for some, as the oriental, have a mixture of yellow, and fome are purplish like red wine; but the best fort are those that thine most like a carbuncle, and are so hard that they may be turned into a fort of diamonds, so as to deceive the most skilful lapidaries. They are found in India, Arabia, Armenia, Ethiopia, Cyprus, Germany, Behemia, and Mifnia; but they are generally as foft as crystal, and are not in very great esteem. The oriental are hardelt; if they are without spots they are of the greatest value. They are found of various sizes, and in various shapes, from the bigness of a small pea, to an inch and a half in diameter. They are adulterated with maftick tinged of a violet colour. placed between two crystals; but the Germans do not think it worth while to counterfeit them, because they are pretty common.

The SAPHIRE, which is a hard gem of a blue or ky colour, is very transparent and sparkles very much; but fome of them are whitish, and others of a deeper blue; and when they are defittute of all colours, they are called white faphires, and are fo like diamonds that they may very well supply their place. They are either oriental or occidental; the former are brought from Calicut, Cananor, Bifnagor, and Coylon; but the best are found in the kingdom of Pegal. It is very subject to flaws, and yet is so hard that a file will not touch it. The colour may readily be taken away by fire, and then it will be converted to a fort of a diamond, infomuch, that when it is fet in a ring, it can hardly be known from one by a skilful lapidary.

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152 The NATURAL HISTORY of

The value of a Saphire is derived from its colour, purity, and magnitude; for if it has no figw, and is of a deep colour, continuing transparent at the same time, it is then the best. It has been common to counterfeit Saphires with a bit of blue glass placed between two Bohemian diamonds. Some tinge glass of a blue colour, and fell it to ignorant people for a Saphire. They are found in various fizes; but seldom so small as other gems, and yet never more than three quarters of an inch in diameter; but the usual fize is between the fixth and the tenth of an inch. The shape is very uncertain; for it is sometimes in one form,

and fometimes in another.

The OPAL is a most beautiful gem, for in different lights it shews all forts of colours, which is occasioned by the different refraction of the rays of light. There are four kinds of this stone, the first of which is transparent, without any opacity, and yet reflects all the colours of the rainbow. Another fort is black, and yet sparkles so much that it appears like a carbuncle; but this is exceeding scarce and consequently highly valuable. The third species reflects various colours; but the yellow is predominant, and confequently this is not so valuable as the first fort. Almost all these are brought from Hungary, and are in very good esteem. The fourth fort is a bastard Opal, and is of the colour of the crystaline humour of the eyes of fish; for it is a little transparent, and is nearly of a blueil milk colour or yellowish; and when it is turned to the light, it feems to shine at the farther edge, by means of the reflection of the light. It is by some called an afterites, or the star stone, because within it may be feen a fort of a flar, which changes its place as it is turned differently to the light.

The CATS-EYE, by most jewellers, is not placed among the opal kind; but is thought to be a peculiar gem, and therefore will require a more distinct consideration. The opals of the first and second kind are seldom to be met with very large; but they are of very great value; for one in the possession of a Raman senator was said to be worth twenty thousand ducats. Those of the third and fourth kind are sometimes met

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WATERS, EARTHS, FOSSILS and MINERALS. 153

with pretty large; for one of these that resected various colours was of the fize of a walnut, and was valued at two hundred crowns. All sorts of opals are found in the East-Indies; but those of the ordinary sort are to be met with in Cyprus, Egypt, Arabia, Natolia and Hungary; and in this last place some of the first sort have been sound in opal stones, though very seldom. There have been also some lately found in Denmark, and they are all contained in a soft stone sull of black, yellow, and sallow coloured veins. With regard to the value, it has been generally thought to equal that of saphires. They cannot be counterfeited like other gems with a double glass, nor yet any

other way.

The EMERALD is a green, shining, transparent gem, and has a very agreeable appearance. It is of two kinds, the oriental and occidental; the oriental are very hard, and of a meadow green colour, which never changes in any light. They are quite transparent, and are in very great esteem, they being of the very best kind. They are brought from the East Indies. as well as Tartary, Egypt, and other countries at a great distance from thence; however, they are very scarce, and there are very few of this kind seen in England. But the American Emeralds are more common, and are found principally in Peru in the earthof the mountains. These are of a very pleasant green. though they are but dull in comparison of the former : for they are neither fo transparent, nor so sparkling, nor yet fo hard; and comparatively the value is but small, with regard to the former. The European come principally from Silefia, and there are coloured crystals found in Germany, that commonly go under the name of occidental Emeralds. The oriental are seldom met with above the fize of a hazel nut. When an Emerald is put in the fire it kindles like brimstone, and the green colour flies off in a flame, after which it looks like a bit of crystal. Hence it appears, that gems in general confift of two parts; namely the crystalline, which is fixed, and the sulphureous, that is volatile. An Emerald is not quite destitute of medicinal virtues; for what is done in the fire, may, in H

154 TWINATURAL HISTORY of

some measure, be performed by the heat of the stomach, and by the digesting stude. However, it must be acknowledged, that the virtue of any fort of gem is not sufficiently apparent hitherto. The best kind of Emeralds have always been in high esteem; but these are exceeding scarce, as has been observed: the occidental being more common, and by far not so good, are of little value with respect to the former. An Emerald may be counterseited various ways, but the best is by melted crystal glass, with a small addition of red lead. By this method, practised judiciously, counterseit emeralds may be produced as good as those of America.

The PRASIUS, or PRASSITE, is by many thought to be the matrix of an Emerald, and perhaps not improperly, because it is sometimes found within it: for the greener parts that are transparent, and without any mixture of yellow, may be properly called Emeralds; and those that are of a golden yellow, may have the name of Chrysoprassites. The colour of this gem is like that of leek, or a mixture of yellow and green. It is but semi-transparent, on account of the clouds that are visible in it; and sometimes it has a mixture of red, white, or black, according to the various stones to which it has been formed, fuch as jasper, crystal, and the like. There is one fort altogether green, another more yellow like dried fern, and a third is very little green, with a great deal of whitish vellow. This last kind is semitransparent, and ought rather to be placed among the nephritick stones. This gem is very common, and so large, that statues have been made therewith, and therefore it can be of little value. The Chrysoprafins is nothing more than a Prassite, that has the colour of gold mixed with the greenness of a leek, and it looks vely prettily, though it is not of much value.

The SMARAGDOPRASIUS is a gem between a Prassite and an Emerald, and is of a grass green colour, without the least yellowness in it; but it is not so green as an emerald. It is sometimes, though very seldom, almost transparent, and is called by some a bastard emerald. These somes are sound in Bohemia

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and the West Indies. The Bobenian is generally opaque, and nearly resembles Roman vitriol. These are said to be the stones that the native Americans near the river of the Amazons wear in holes of their lips, in pieces about the length of a man's singer. Some take this to be the true nephritick stone; but this is doubt-

ful, as well as its virtues.

The CHRYSOLITE is the topaz of the ancients, and is a transparent gem, shining with the colour of gold. It is of a fainter green than the emerald, and has fomewhat of a yellowish ringe. Some take it to be the matrix of the emerald, and by many it is confounded with a chrysoprasius. This stone will not fland the test of the file, and fometimes there are such large pieces of it that statues may be made therewith. The topaz of the shops is the Chrysolite of the ancients, and is a transparent stone of a shining gold colour without any mixture. It is of two kinds, the oriental and the European; the first of which shines like pure gold. The European are as foft as crystal, and have a mixture of blackness with the gold colour; and there is fometimes fo much of it, and fo little of the yellow, that if it was not for the blackness, it could not be diftinguished from crystal. Sometimes pieces of these have been found to weigh twelve pounds, and there was one brought from Bohemia that was two ells in length, and near half an ell broad; These stones may be counterfeited in the same manner as the rest; but the best way is to put a quarter of an ounce of faffron of iron, and a little red lead into a pound of melted crystal glass, or if one part of calcined crystal be added to three of lead, and then kept for a whole day in a furnace, a topaz will be formed without any other addition.

The BERILL is a gem of a blueish green like sea water, for which reason it is called by the Italians Aqua Marina. When it has rays of a gold colour, or the sparkles are of that colour, it is called a Chrysoberill, and some place it in the same class as the chrysoprasius. All these stones are transparent, and have but a faintish colour, for when this is more deep, they are taken for other gems. It is found of various sizes and of different shapes, that

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156 The NATURAL HISTORY of

are seldom more than a third of an inch in diameter; and the value is always in proportion to the fineness of the colour. It may be counterfeited by reducing burnt copper to an impalpable powder, and melting it with crystaline glass, or calcined crystal, in the

proportion of one dram to a pound of glass.

The ASTERIA, called by the Italians Girasole, is a sort of opal; only it is harder, and consequently may be placed by itself; especially as it may be distinguished from an opal very easily. The harder it is, the better it reslects the image of the sun, and so agreeably, that it is by some called the gem of the sun. This stone is transparent like crystal, but much harder. It has been named by some the cats eye, because the sparkling is sometimes greater and sometimes less. It differs from the eyes of Belus termed by the Italians Bellocchio, because it exactly imitates the iris of the eye and pupil. Specimens of this have been taken from the matrix of opal, and when exposed to the sun, they emit sparkles like so many small stars.

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We now come to the femi-transparent stones, among which the SARDIUS, or CORNELIAN, is reckoned the chief. By fome it is called the Carnelian; because it is of the colour of raw flesh, for Care is Latin for flesh. However, it is more of the colour of bilious blood. It is femi-transparent like the washings of flesh, and is called by Pliny Sarda. It was in common use among the ancients, especially for seals, as it is at present. - It was first found by the inhabitants of Sardis, a town of Lydia in Afia Minon, and from thence was carried to Rome; but there was a very good kind found near Babylon in the heart of a stone. There are three kinds of it; namely, the red, the demium (which looks duller or fatter than the former) and that which feems to have a mixture of filver films. Those of the East Indies are most transparent; and the thicker or fatter fort is brought from Arabia. It is also found in the West Indies, as well as Silefia, Bobemia, and many other places. There are three kinds of Cornelians, the first of which is the red, now taken notice of. The fecond is of a faint blood colour, and femiWATERS, EARTHS, FOSSILS and MINERALS. 157

femi-transparent; and the third is of a yellowish red. It is usually found in other stones. It was formerly in high esteem; but since other and better gems are more common, it is of little value, being chiefly made use

of for feals, as was aboved hinted.

The SARDONYX feems to be of a middle nature. between the cornelian and the onyx, which its name feems plainly to imply. It is generally tinged with white, black, and blood-colour, which are diffinguished from each other by circles or rows, so distinct that they appear to be the effect of art. There are many kinds, and great diverfity in the colour of thefe flones; but the greater variety there is of these last, the more they are valued. They have fometimes purple, blue, rofe-coloured, and yellow circles, whole ground is black, especially the Arabian; for in the East Indies it is of the colour of horn. When the circles are not diffinct, but as it were separated, and of the colour of honey, they are of no great value. The best fort is brought from the East Indies, and the next to that is the Arabian. It is found also in Genmany, Bobemia, Silefia, and the neighbouring countries; but it is feldom clear, nor are the circles diftinct like those of the East-Indies. There are pieces of the Sardonyx found so large, that drinking vessels may be made therewith.

The CHALCEDONY is placed by Phiny in the class of rubies of a darker aspect, and yet paler than a carbuncle; but this is evidently the characteristic of a garnet. This gem is generally of the same colour throughout; though it is sometimes a little clouded. It is femi-transparent, and so hard, that it is seldom or never made into feals. It was formerly placed in the class of onyx's, of which it is a species, and was called the White Onyx. It is either Oriental or European; and those that have a mixture of a faint colour are hard and beautiful, and are taken for the oriental. Such as these have a purplish or blueith. mixture, or a redness like that of lac. Those that are earthy, or of a dulky whitish colour, are of little value, and are met with in all parts of Germany. There are always some found in the Netherlands.

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158 The NATURAL HISTORY of

Those that are tinged with a disagreeable reddish or vellowish colour, though they are not of the oriental kind, are in higher esteem than the last. Some of these have been seen in Lorrain of a surprising magnitude, and when they have been struck with a hammer have yielded a ringing found. Those are accounted best of all, in which there is blue, white, yellow, and red confusedly mixed together, and which exposed to the fun shew all the colours of the rain-bow. This also served to make the Myrrhine vessels of the Romans, which were so highly valued, and at this day they are wrought into cups, heads of great men, and the like; but its chief use is for seals, because the wax will not flick thereto. Some of these stones, brought from the East Indies, are almost transparent, and of a whitish pale colour, and some are tinged with white circles or zones. They are now of little value, except when the pieces are large and fit for the making of figures.

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The ONYX, which in Greek fignifies a nail, is fo called from its likeness to the colour of the nail of a man's hand. It is feldom transparent, and generally confifts of a mixture of black and white colours, which are quite distinct from each other. The horny colour is often marked with whitish veins or zones, fomewhat refembling an eye. The kinds of Onyx are distinguished, either from the places where they are found, or from their different colours. The Arabian Onyx is black with white zones, and a variety of other colours. When the white zone in carving any figure is placed on the top, and the black ferves for a ground, it is called Camehuia by the jewellers, as if it was a distinct gem. When it is white, it is called a Chalcedony, before described. Some Onyx's are quite black, others are tinged with fallow colour, yellow, whitish, blueish, and horn colours, mixed in an agreeable manner. They have all zones or ftreaks, which distinguish one colour from another. The Onyx has been fometimes found follarge, that columns have been made therewith; and there are now fix of this kind in St. Peter's church at Rome. This likewise ferved to make the Myrrhine veffels before taken no-DION

WATERS, EARTHS, Fossils and Mikenats: 199

tice of, and is now made use of for cups, statues, and the like. It is of greater value than the sardonys; those are best which are blueish at the top, and blackish at the bottom; and these are much sought after by the Jews. This stone does not stick to wax, and therefore is as often now, as formerly, made into seals.

The AGATE is very like an onyx, with regard to colour, but it differs from it in being adorned with zones, whereas the Agate has none; but instead thereof there are lines or spots of various colours, in such a manner as to represent the pictures of different things, as woods, rivers, fruits, slowers, herbs, and clouds, though not very diffinctly. An Agate differs from a Jasper in hardness and smoothness; for though the jasper has all the same colours, it is softer, and

confifts of rougher particles.

The White-veined AGATE, with delineations of trees and mosses, is most commonly known by the name of the Mocha stone. It is of a very firm compact and fine texture, though it is found in the shape of a flinty pebble-stone. The fizes are various, being fometimes only one, and fometimes eight inches in diameter. The veins of this stone are very beautifully disposed in different figures; but generally there are many concentric irregular circles drawn round from one to three points in various places. They are commonly a little whiter than the ground, though fometimes they can scarcely be seen. Those of this kind are of the highest value, and contain the figures of trees, mosses, sea-plants, and the like, which were just taken notice of. Some have supposed that these are only petrifications, and that real mosses and sea plants were included therein; but this is a mistake. which is evident from hence, namely, that the real things which they represent were never met with so diminutive as their images in these stones: for none can be fo foolish as to imagine, that there ever was a perfect tree no more than half an inch high. These figures are generally black, or of a dufky colour, and appear with great advantage from the whiteness of the flone. This kind of Agate, when it is perfect, is only found in the East Indies; but there are some of an inferior fort to be met with in Germany. They are called Mocha stones, because they have been brought from the East Indies to Mocha in Arabia, and from thence transported into Europe. However, there are some that will not allow them to be found in the East Indies; which if true, they may as well have the name from the place near which they are found; or at least they may be brought to Mocha from other parts of Arabia, or even Asia.

The Dull Milky AGATE is not fo valuable as the former, though it is of a very firm texture. It is found in the shape of common shint stones, and is from one inch to ten in diameter. It is of the colour of milk, or rather like that of cream; and, when it is broken, has a smooth glossy surface. It is more opaque than the former, and yet it will bear a very sine polish. This species is common on the shores of the rivers in the East Indies, and there are some of

less value met with in Germany and Bobemia.

The Lead-coloured AGATE, with black and white veins, is of a very fine, firm, compact texture, though it is found, like the former, in the shape of common flint stones, and of as rugged a surface. The ground is of a pale blueish grey, or rather of a dove-colour, and is often without variation, though it has sometimes black and sometimes white veins, which are generally towards the centre of the stone. This resembles an onyx very much, but is certainly distinct from it. It is very hard, and will bear a fine polish. It is found in the East Indies, as well as in Germany, where they make cups and snuff-boxes therewith.

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The Flesh-coloured AGATE is not so valuable as any of the former, though within it has a pretty firm compact texture, and is from one to ten inches in diameter. The slesh-colour is very faint, and almost whitish; but yet it is never entirely wanting. Sometimes it has no veins at all, and at other times it abounds in veins, spots, or clouds. The spots are generally very small, about the size of a pin's head, notched at the edges; though sometimes they are much less. When broken in pieces it is very smooth and glossy, though it is not always of the same transparency.

WATERS, EARTHS, FOSSILS and MINERALS. 161

rency. It is found in Germany, Bohemia, and Italy, and is worked into various forts of vessels: it is also

often made use of instead of gun-flints.

The Blood-coloured AGATE is more beautiful than most of this class. It is always of a deep blood-red colour, sometimes throughout, but more frequently variegated with a pale blue and brown. The blue always surrounds the red, and inclines to the colour of whey; but it is in no other part of the stone. The brown is of the colour of horn, and generally appears in irregular veins, sometimes in such plenty as to make the ground to the stone, and the red with its blue edges only the variegation. It is not very common, though it is found in the East Indies, America, and some parts of Germany. It is chiefly used for the tops of snuff-boxes.

The Clouded and Spotted Flesh-coloured AGATE is of a very fine close texture, though it is subject to flaws and cracks when the pieces are large; for which reason the lesser stones are most esteemed; but, in ge-

neral, it is in very little efteem with us.

The Red AGATE, variegated with Yellow, is of the colour of red lead, has a fine pure equal texture, with a smooth regular surface, and is commonly sound in the shape of a pebble stone. It is from one inch to four or sive in diameter, and its ground is of a paler red with one that is deeper, disposed in concentric veins round from one to three points; but this does not appear without close examination. Besides these it has irregular bright yellow blotches, that are never intersected by the veins, but are either within or on the outside thereof; and they are always extremely short, being never above a fixth part of an inch in length. It is very hard, and will bear a very sine polish; it is found in the East Indies, though it is not very common there.

The Yellow AGATE has been found from one to feven inches in diameter in various shapes and sizes; but they are all of a very firm compact texture. It is sometimes of the same colour throughout; sometimes consists of irregular veins, and at others has a pale and almost white ground, veined and spotted with a

ftrong

162 The NATURAL HISTORY OF

ftrong yellow, exactly refembling that of a fine yellow bees-wax. It is very hard and capable of a fine polish; but the degree of transparency differs greatly, for fometimes it is as much fo as any of the rest, and at others it is almost entirely opaque. It is found in the East Indies and America, as also in Germany, though not very good. In some places it serves to make knife-handles and the like.

The Pale yellow AGATE, variegated with white, black, and green, is called the Leonina, from its likeness to a Lion's skin. It is more variegated than the rest of the stones of this kind, and has a fine compact close texture, though it is found in very irregular shapes, with a rugged outside. It sometimes seems to confift of an irregular mass, made up of the abovementioned colours, and at other times is diffinally rlouded therewith, and fornetimes again it has black and green veins in the form of concentric circles running round a point. The ground is always of a pale yellow, but very differently disposed; sometimes more, fometimes less. Likewise in some, one or more of these colours are wanting, while others contain them all. The green is like that of Jasper, and the black is inclinable to brown. It breaks with some difficulty into pieces, with fine smooth surfaces, and is brought from the East Indies; but it is not commonly known, because it is very scarce.

The Blackish Veined Brown AGATE is found in stones that have a pretty smooth surface, though of an irregular shape, and from two to seven inches in diameter. The brown is pretty deep, and is finely clouded, spotted, and veined with a colour that is almost black, and the veins are generally paler and browner than the other variegations. The veins are edisposed in irregular concentric circles, and the innermost are generally broadest. There have sometimes been vegetable substances found in the middle of it, fuch as the flender roots of mois, or of crow filk. It is capable of a very high and beautiful polish, and is commonly cut into feals, buttons, heads of canes, knife-handles, and the tops of fnuff-boxes. It is frequently adorned with factitious colours, which fink 92011

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WATERS, EARTHS, FOSSILS, and MINERALS. 163 into the substance so much, that they appear like the natural veins of the stone; and then it is of great value.

The Greenish Brown Variegated AGATE seems to be of a middle nature between Agate and Jasper. It is a beautiful species, and is found in roundish stones with a smooth even surface, from two to six inches in diameter. Its texture is very firm, and it is sometimes of the same colour throughout, being only distinguishable from the true Jasper by its hardness. But it has most frequently a brownish green ground, variegated with irregular concentric circles, of a red, or of a finer green; it is also found irregularly clouded and spotted, with the same or other colours, as white, fiefh-colour and yellow. It is never entirely transparent in those that are clearest; and it is found in different parts of the world, but not equally good; for the European are the worst, they being more coarse, foft, and opaque, than those of the East or West Indies. The man part of the trail was read to a consequent

The JASPER differs little from an Agate, only it is softer, and will not bear so fine a polish, because it consists of groffer particles; besides, it is not so transparent, and is most commonly green; and the nearer it comes to an Emerald, the higher is the value. However it is of other colours, and on that account is divided into different species, among which are in-

cluded the Nephritic Stones.

The White NEPHRITIC STONE has a very ine, compact, firm texture, with a smooth glossy surface, and is of various sizes; but the common fort are two inches in diameter. The shape is very irregular like a common shint, and it is naturally of a sine white, with great brightness and transparency. It has sometimes a blueish tinge, which makes it appear of a deep pearl colour, and upon that account is more valued by some; but when it is yellowish, it is not in great esteem. It looks pretty much like marble, but breaks into sine glossy bits, and is considerably heavy, as well as very hard. It is found in many sarts of America, particularly near the river of the

Amazons. It is often cut into fmall cups and other

toys, which are extremely bright.

The Green JASPER is a bright semi-transparent stone, and of a close, very hard, irregular texture. It has been found in masses of many seet in diameter, sometimes no bigger than a horse-bean. It is of a deep beautiful green, and almost always of the same colour throughout; though it has been sometimes met with clouded with white. It is externally pretty, bright and glossy, and breaks into smooth pieces, seeming to be of a texture between shint and marble. It is considerably heavy, and its very great hardness renders it capable of a fine polish.

The Soft Dusky Green JASPER is not so heavy nor so valuable as the former, and is generally sound in stones of a stat shape, from two to sive inches in diameter. The surface is pretty sull of superficial cracks, and the colour is always dull, with sometimes a blueish and sometimes a brownish cast. It is so common in Guernsey, that it is frequently brought over with other things, and is often made use of to

pave the streets of London.

Hard Blueish Green JASPER, variegated with red, is called Oriental Jasper. It may be easily distinguished from all others by its blood-red spots, and it has a very firm and compact texture. It is found from two to six inches in diameter, and has a roughish irregular surface, but has no determinate shape. It is not at all transparent, except in very thin pieces, and is sometimes veined and clouded as well as spotted with red. It is most commonly known by the name of Blood-Stone, and will take a very sine polish. It is common in Egypt, Africa, and the West Indies, and is by some termed the matrix of the Emerald. It serves for various purposes, particularly cups, sous-boxes, and seals.

The Hard Whitish Green JASPER is the nephritic stone of the ancients, and is generally of the same colour throughout. It is harder than a Jasper, and the surface seems as though it was smeared with oil. It is sometimes of a whitish green, which last colour is sometimes yellowish, and sometimes blueish; but

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WATERS, EARTHS, Fossils and Minerals. 165

generally it seems to be composed of greenish white, yellow, blueish and black colours; but not all at the same time. The common sort are from two to sive inches in diameter, and the shape is very irregular like common slints. It is found on the surface of the earth, and in the beds of rivers in many parts of America, where they form them into the sigures of birds, beasts and sishes.

The very hard Yellowish Green JASPER is more dull and opaque than the former, though the texture is very firm and close. The colour is properly a mixture of green and yellow, in which it differs chiefly

from the former, and in its transparency.

The Blueish Green JASPER, variegated with blue and black, is a kind of nephritick stone, it being of a middle nature, between the oriental green Jasper, the green nephritick stone, and the marble Ophites. The texture is firm and compact, and is found from four to fix inches in diameter, and generally of a flattish oval shape, with a rough surface. The colour is usually very agreeable, and is always made up of a mixture of green, grey and blue, which are sometimes paler and fometimes deeper, as well as inclining to other colours. Sometimes they are fo blended. as to render it of one colour throughout, and fometimes they are disposed in clouds, spots and veins: and then the colours are as distinct as in the bloodfone. It is found on the banks of the great river of the Amazons in America.

The Hard Greyish Green JASPER is a very hard flone of a greyish green colour, approaching to that of an olive; but the green is of three different kinds. The finest sort is brought from the East Indies, and the Turks and Poles make handles of it for their sabres and cutlasses. It is capable of a very elegant polish, and is found from fix to ten inches long, of an unequal shape with a rough surface. It has little or no degrees of transparency, but it is remarkably heavy,

and is found only in the East Indies.

The Dull Deep Green JASPER is of a green colour like mallows, from whence it has its name, for Malache in Greek fignifies Mallows. It is generally adorned

adorned with white veins, and the blueish colour that is intermixed is very ornamental; but when there is any black therein it debases the value. It is pretty heavy, and will take an excellent polish. It is brought from the East Indies and America, and is also found in Germany, and fome other parts of Europe, but is

not lo good as the former.

The Dusky Green JASPER, variegated with white and flesh-colour, is a rough, coarse and rugged stone, which is found from thirteen to eighteen inches in diameter, is generally of a roundish or oval shape, and always flatted more or less. The texture is firm and compact, and it is often mixed with a variety of colours disposed in a different manner. It is always green in part, and has often thin transverse veins of flesh-colour and white, with spots and clouds of black. The green is not always the fame, for it is fometimes deep, and at other times light; but generally the variety is very agreeable. It is very hard, and for that reason will bear a good polish. It is common in the island of Jerjey, from whence it is brought among other stones to pave the streets of London; but it might be put to a much better use.

Hard Variegated Purple JASPER has been called the rose-coloured Jasper by Pliny. It has a smooth fine, hard texture, though the furface is rough and unequal like a flint stone; it is sometimes fifteen inche in diameter, and is variously tinged with colours, it which the red and blue are always predominant, which when uniformly mixed render it purple; but where is blue, it is always most bright and transparent. is brought from various parts of the world, as the Ea and West Indies, Egypt, Germany, Bobemia and Spain in which last place it is cut into vessels and images

because it will bear a very fine polish.

Bright Red JASPER, variegated with white, is no fo hard as the former, nor of fo fine a texture, and found from the fize of a hazle-nut to that of a man head. The colour is that of red lead, and the mo certain colour of the variegation is white, which is a most always disposed in regular narrow veins, thoug Sometim

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WATERS, EARTHS, FOSSILS and MINERALS. 167

fometimes in spots. That which comes from America

is generally accounted best.

Dull Purple and White JASPER is of a coarse and irregular, though of a very firm texture. The purple colour sometimes insensibly changes into a pale red, and the white to a yellowish or blueish colour; it is hard to say which of the two is predominant. It is considerably heavy, and so very hard as to be capable of a good polish. It is brought from Italy and Germany, as well as found in England, and serves to make the handles of knives and tops of snuff-boxes.

Pale Brown Hard JASPER, with purple veins, has much the same texture as the former, but is more beautiful. It is usually found from two to four inches in diameter, and is commonly of an oblong flattish shape. Its ground is an agreeable pale whitish brown, and its variegations consist of regular horizontal and sine deep purple veins, or of a pretty pure white. It is common in York bire and Sussex, and is sometimes

met with in gravel pits near London.

Yellowish Hard Variegated JASPER has a very close, hard, and compact texture, though the surface is very rough and irregular. It is generally met with from three to seven inches in diameter, and the predominant colour is a pale dusky yellow, not unlike honey. It is variegated with white, brown, lead-colour, and a very pale red, with which is mixed a cloudy trystalline substance. These colours are blended in the form of clouds; but sometimes one and sometimes another is wanting. It is extremely hard, will take a very fine polish, is common in the East Indies, and is also met with in several parts of Europe. The only use of it at present is to make handles for knives.

The Pale Blueish JASPER, with black veins and louds, has a very close firm texture, and its fize is from four to fix inches in diameter. It is always of a losky blue or lead-colour, and the black clouds ppear like curling smoke. It is but of little value,

nd confequently not much in ufe.

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The Blueish Marbled JASPER, variegated with thite, is of very little value. The colour is of a ale disagreeable grey, and a pretty clear white; but

the former colour is the ground, and the other appears in veins or irregular clouds. It is pretty heavy, hard, and will bear a good polish. It is common in the gravel pits about London, and is generally taken for a bit of blue and white marble that feems to be worn by the collision of other stones, for it is rounded at the edges. There is also a black marbled Jasper, variegated with white, and another marbled with yellow.

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The Hard Dull Flesh-coloured JASPER is extremely hard, of a very close texture, and is found from eight to eighteen inches in diameter. It is of an extremely pale whitish red or flesh-colour, which is generally the same throughout, though there are sometimes horizontal veins of a darker red. It is found on the sea shore, and is commonly made use of in pavements. It must be observed, that all these Jaspers strike fire with steel, and will not effervesce with aqua

fortis.

The TURKY STONE, called by fome the Turquoise, is of two kinds, the oriental and the occidental; the first is rather blue than green, and the other is more inclinable to the latter colour, though it sometimes inclines to a whiteness. They are found in the East Indies, Persia, Spain, Germany and Bobemia. In Perfia it adheres to blackish stones, and is very common; but it feldom exceeds the fize of a hazle-nut. Those of the East Indies differ in their colour, for fuch as are faid to be of the old rock, always preferve the fame colour, but those of the new, are greener. This stone is in so high esteem among the Turks, that those of the better fort are feldom without one; but it is never worn by the women. It is generally valued in proportion to the brightness of the colour. Those that are of the fize of a hazle-nut, are of a fine sky blue without any blackish veins; but the lesser sort are not so good. Those that have blackish veins, or are inclinable to greenish, or to the colour of milk, are of no value. There is another Turky stone, which is nothing but ivory, a tooth, or a bone, which have lain in the neighbourhood of copper ore till they have been tinged with deep blue spots and veins; but when they are put into a gentle fire the colour diffuses itself throughout

WATERS, BARTHS, FOSSILS and MINERALS. 169

throughout the whole substance, and becomes of a very fine pale blue. There are several mines of these stones in France; but they may be perfectly counter-seited by art with a tincture of copper in an alkaly.

The LAPIS LAZULI is an opaque stone of a fashire colour, with golden fpots or fireaks. It differs from an Armenian flone in being harder, for this may be easily reduced into powder; and, besides, it is without veins of gold. This is the stone with which they make the colour called Ultramarine. It is of two kinds, one of which will remain unchanged in the fire, and the other not. It is found in various countries, and the Armenian stone is faid to be its matrix. which is met with in gold mines. It is found in very large pieces; but the common fort are only big though to make knife-handles and the tops of fhuffboxes. The best fort, which will not in the least change its colour in the fire, is brought from the East Indies; and this is the test whether it is right or not; for that in Germany, which is of a middle naare between an Armenian stone and the true Lapis azuli, alters in the fire, and is much more brittle han the true. However, they both will ferve very ell for the use of painters. Lapis Lazuli has the roperty of purging upwards and downwards, and herefore has been accounted good for melancholy librders, quartan agues, apoplexies, and the falling tiness. There is no room to doubt that the blue lour arises from particles of copper, for which reait is taken by some to be a copper ore.

The ARMENIAN STONE has a smooth surface, and is of a sky-blue colour; but it is brittle, by which may be distinguished from Lapis Lazuli; besides hich it has no gold spangles, nor will it keep its sour in the fire. The blue colour has a greenish st, and when it is made use of in painting, by sight of time it changes to green. It is found in value places of Germany, as in the county of Tyrol, it in other silver mines. It is also met with in Hungry and Transilvania. Whenever it is used as a lat, it must be mixed with petroleum, or rock oil,

then it will keep its colour.

170 The NATURAL HISTORY of

The ASTROITES, or STAR STONE, seems to be a kind of opal, and by some is called a Cat's Eye, or Gem of the Sun; but that which is properly so called has been treated of before. It is a very beautiful stone, and is usually set in rings; it contains the sigure of stars so exactly, that no painter can imitate them better. It is an opaque gem, sometimes of a white, ash, dusky, or grey colour. In this sort of stones are sometimes seen roses, sometimes waves, and at other times they contain all three together; which may serve as so many different distinctions of this stone. It is sound in various places, particularly in

Tyrol, as large as a man's head.

The TOAD STONE feems to be a kind of an astroites; for it is of the colour of that stone, and marked with dark spots, only the ash or grey colour has a reddish cast. It is convex like an eye on one fide, and flat on the other. There are two kinds of these stones, the first of which is called by some Brontia and Ombria, and is of a dusky, reddish, yellowish, or greenish colour; sometimes of the fize of an egg, and like one, only it is flat on one fide. Some take these to be serpent stones or thunderbolts; but the common name is that of a Toad Stone. All these stones differ among themselves: however, that properly fo called has the name of Batrachites, but the Brontia and Ombria are called Chelonites. It is now taken to be a petrified substance, and some suppose i to be the tooth of a fish; but this does not feem to agree with its shape. Indeed there may be some in the form of teeth comprehended in this general name but that refembling an egg is the most common for They are all hollow more or less, only some are fille up with the stratum in which they lay, and some them refemble the cup of an acorn. Another fo are of an oblong figure, but round at the top, 21 others swell a little in the middle. Many of the have an outward circle of a different colour from t rest, and this is sometimes streaked with very h lines: fome are also found very long in proportion their breadth, and others perfectly round. They a all naturally of a very fine polish, and are worn

Page 170

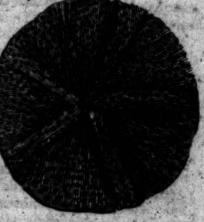
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WATERS, EARTHS, FOSSILS and MINERALS. 171

rings without alteration. They are of different fizes, from a pin's head to two or three inches in circumference; and are of a great variety of colours, as above taken notice of.

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CHAP. XXII.

Of the more ignoble STONES.

THE EAGLE STONE feems to confift of feveral shells or crusts laid one over another; but that which distinguishes it from all others is its being hollow on the infide, in which cavity there is another stone that is smaller: this, when it is shook, may be heard to rattle. It is of various colours, as white, grey, dun, or brown. Modern authors have only three forts of this stone, the first of which is rough on the outfide, and is of different colours, but commonly of a black dun: this makes a very diffinct noise when rattled. The second is of an ash colour. and contains a fort of marl in the infide, which is fometimes white, yellow, red, or blue. The outfide is rough and fandy, and feems to confift of the particles of flint. A third is of feveral colours, but has the like contents as the former. The first kind is no bigger than a peach-stone, but the other two are often as large as a man's fift. These fort of stones are

The GEODES is a fort of an Eagle Stone of a round shape, and contains sand or earth, which makes no noise when shook; for when it rattles it may be properly placed in the former class. It is found in Misnia, and near Pelsna in Bohemia. It is of a reddish colour, and of the size of a man's fist; but it is

of no manner of use. To is wolfers as greated bein , sword

The ENORCHUS is another species of an Eagle Stone, and is generally of the size of a pigeon's egg. This contains one stone within another, as the yolk of an egg is contained in the white. It is not smooth on the inside, but is tinged with various dirty colours, and on the outside is of an ash colour.

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172 . The NATURAL HISTORY of

Authors mention many other species of this Stone, such as the rough purplish, the red and dusky yellow, the yellow, brown, and black crusted, the purplish red, the coarse yellow and brown, and the coarse

Eagle Stones.

There are also five kinds of the Geodes, which are diftinguished by the names of the Cracked GEODES with ferruginous brown and yellow crusts. This is always hollow, heavy, and of a regular shape; it being oblong, and larger in the middle than at the ends. It is generally about two inches long, an inch and a quarter broad, and three quarters of an inch thick. The outer shell or crust is of a yellow colour, with a mixture of reddish brown, and is fmooth to the touch. though it is all over cracked in different directions. However, it is very hard, and will not break without a strong blow; and, when broken, it is found to contain a yellow earth, with a little mixture of fand. It usually consists of three crusts, the innermost of which is of a blueish black colour, the middle of a deep brown, and the outermost yellow as above. It is met with among gravel. faces to man a empetation

The Wrinkled GEODES, with ferruginous, reddish brown, and gold-coloured crusts, is very heavy when pieces of it are considered apart; but when unbroken it is light, because it consists of a large hollow case. It is about three inches long, and two and a half in diameter, and has no distinct coat different from the general substance. It is of a fine gold colour, with a small mixture of brownish red, and is full of wrinkles or superficial cracks. The cavity is usually divided into several cells, and contains a small quantity of fine bright yellow earth. The shell, when perfect, consists of a great number of coats, some of which are of a ferruginous colour, others of a reddish

brown, and others as yellow as gold.

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The Sparkling GEODES, with ferruginous, purple, and orange-coloured crufts, is subject to great varieties, excepting the internal structure. However, it is generally oblong and flattish, and sometimes it is full of protuberances, sometimes branched, and sometimes again tapering to one or both ends. It is bred

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WATERS, BARTHS, FOSSILS and MINBERLS. 173

among gravel, and confequently has a very rough outfide, it being covered with pebbles of different fizes.
It is generally four inches long, two broad, and an
inch and a half thick; though lometimes it is twelve
inches long. Different stones contain earths of different kinds; and the shell is composed of eight or ten
coats, which are all bright and sparkling. Some are
of a dark iron grey colour, others of a dusky purple,
and others of a saffron or orange colour.

The Long Rough GEODES, with a fingle purplish crust, is always of an oblong shape, of a firm substance, and considerably heavy and hard. It is yellowish on the outside, and is about four inches long, and three quarters of an inch in diameter; but the surface is strangely rugged and uneven. It has only a single coat of a mixed purplish iron-grey colour,

and is a little sparkling.

The Long GEODES, with a fingle blackish crust, is always of an oblong irregular form, it appearing frequently twisted, and of a different thickness in the different parts of the same mass. The outside is generally so invested with a stratum in which it was formed, as to appear of a brownish yellow. It is sometimes two inches long, three quarters of an inch broad, and above half an inch thick; but it varies in size. It is very brittle, and when broken is of a blackish colour, a little sparkling; and the cavity is silled with very sine bright red earth, though sometimes it is not without mixture.

The stone called ENHYDRUS is a kin to the Eagle stone, but it contains nothing but water. The sirst of these is the thick-shelled Enhydrus, with black, reddish brown, and yellow crusts. It is of a close, even, compact texture, pretty heavy, and very hard; and always is of an irregular roundish shape, but very slat, rising in the middle, and thinner towards the edges. It is about four inches in diameter, and two thick where thickest. The surface is rough, and of a mixed yellow and brownish red colour. When broken it is found to be a very thick shell or case, containing a small quantity of water, which is generally muddy. The shell usually consists of three thick coats,

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174 The NATURAL HISTORY of

of which the innermost is blackish and shining, but that in the middle is of a dufky brownish red, and the outermost of a bright yellow. The cavity is large,

and generally divided into different cells.

There are still other stones of the Eagle kind, which may be referred to the Enorchus, of which the first is the very Hard Smooth ENORCHUS, with brown, yellow, and red coats. The texture is fine and compact, with a pretty smooth even surface, and is remarkably heavy. It is always of a roundish oblong figure, and is found from a quarter of an inch to four inches in length; but its usual fize is that of a pigeon's egg. It is fometimes met with smooth and gloffy, and fometimes covered with a whitish crust. It confifts of only five or fix coats, inclosing a firm, hard, and folid nucleus of the fame nature and texture. This is of a deep dusky brown colour, sometimes of a firong red, and fometimes has a mixture of both. The coats are alternately dark brown and reddifh.

The Hard Glittering Rough ENORCHUS, with brown, purple, and deep yellow coats, is much more rugged than the former, and of a coarse unequal texture. It is always of an oblong shape, and is found of feveral fizes, from half an inch to eight inches long. The furface is made up of finall prominences and cavities, less than the heads of the smallest pins, which give it the appearance of shagreen. The nucleus is but small, and is surrounded with eight or ten coats, irregular in thickness and of several colours, as pale brown, deep brown, dusky and reddish yellow; and the nucleus is fometimes purple, but more generally of an orange colour. The substance is pretty bright and sparkling, not only within, but on the

furface of the stone.

The Soft Brownish Yellow ENORCHUS is quite of a different nature from the former two; for this is only a composition of fost earth, though the texture is close and smooth. It is always of a flattish oblong shape, and is commonly four inches in length, two in breadth, and one in thickness. It is of the same colour throughout, and the nucleus is of the fame shape as the stone, but of a very agreeable brownish yellow,

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WATERS, EARTHS, FOSSILS, and MINERALS. 175

as well as the coats themselves, which are almost innumerable. It has no manner of brightness, but looks like clay. There are two other forts of the soft Enorchus, the one with a shining brown and dusky green coat, and the other with a shining whitish,

vellowish, and red coat.

The HÆMATITES, or BLOOD-STONE, is fo called from its colour, which is that of darkish blood; though it is fometimes black, fometimes yellow, and fometimes of the colour of iron; but its streaks always resemble antimony, and when it is calcined it turns to a reddish colour. It was formerly divided into feveral kinds, but now there is only one treated of by authors. It is found in various parts of Germany, in marl-pits and iron mines: It is now known to be a rich iron ore; for, when melted, a great deal of that metal may be extracted. It is of various degrees of purity and hardness; for sometimes it is of a coarse texture, and seems to be composed of large filaments. With regard to its medicinal qualities, it is now generally used in some disorders of the eyes, especially to remove spots and films.

The SMIRIS, in English EMERY, may be placed in the class of the Hæmatites. It is of an iron grey colour tending to blackness, and so hard that it is used by jewellers, glass-grinders, and smiths, for polishing their work. It will cut glass almost as well as a diamond, and is reckoned a fort of an iron ore. It is found in large masses, bespangled all over with

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The PUMICE STONE is spungy and full of small holes and cavities. It is of several colours, as ash-coloured or white, which are so soft that they may be crumbled to pieces between the singers; but some are more hard, though they are all so light that they will swim on the surface of the water. It is sound in divers places, but especially near burning mountains, from whence it is thrown out. It is used by various artists for different purposes; and in some places they use it in the baths to clean the skin.

The MAGNET or LOAD-STONE is well known for its property of attracting iron, and for its pola-

rity;

176 The NATURAL HISTORY of

rity; for, when suspended, one end always points to the north, and the other to the fouth. It is found in various places, and often in iron mines; which is no wonder, for it is a kind of iron ore. It is generally of an iron grey colour, with a blueish cast, and sometimes reddish without, and blackish within; but that which is bluest is best. When a needle is touched with a Load-stone, the Magnet will not attract both ends equally, but will repel the one, and draw the other, which is known almost to every one.

C H A P. XXIII.

of SAND-STONES, ROCK-STONES. MARBLE and ALABASTER.

HE Bright White Brittle SAND-STONE is coarfe, harsh and rough, and of a loose porous texture. The furface is of a dufey, dead white; but immediately after it is broken it glitters pretty much. It is composed of a large angular crystalline grit, which is very hard and firm in the mais; but when in imall pieces as foft as loaf-fugar, and falls into a white fand like powder. Water, when poured thereon, will inmediately fink through it, though it will ftrike fire with steel, and will foon blunt the workmens sools. It makes no effervescence with agua fortis; but it burns to a beautiful pale red. It is used in building, and will bear the weather pretty well; but it will not take a polish. They build houses with it in Northamptonfbire without mortar.

The Dull Greyish White Brittle SAND-STONE is coarse, rough, and of a loose texture. It is pretty heavy, without splendor, and is composed of a large irregular grit, mixed with a foft loofe fubstance in the form of powder. When examined with a microscope, it appears to confift of an angular obling transparent large grit, which adhere together in very few places; but the pores are filled up with a whitish powder, and while in the earth it is very moist and crumbly. It is much used in building, because it cuts very easily. When rity

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WATERS, EARTHS, FOSSIES and MINERALS. 177
When water is poured thereon it will become wer
through; but it will hardly firike fire with feel, and
yet it will make a violent effervelcence with aqua
fortis. It burns to an almost white fieth colour.

The Hard White Dull SAND-STONE confifts of crystalline grits that are not very pure; but they are cemented together by a finer crystalline substance. It is very coarse and rough, and of a close, compact, dense texture, it being very hard and pretty heavy. It is penetrated by water very slowly, and will not readily strike fire with steel; but it ferments very strongly with aqua fortis, and burns to a pure white. It is common in Dorsespire, and does not lie so deep in the earth as many others. It is a very good stone for

building.

The Loose Dull Whitish SAND-STONE is very coarse and pretty heavy; it is composed of a very hard roundish grit, cemented by an earthy spar. It is not very hard in the mass, and when in small pieces it will crumble into powder between the sugers, and when water is poured on it, it will readily penetrate its surface. It will not strike fire with steel, but will effervesce violently with aqua fortis, and burn to a reddish white. This is known in London by the name of Portland Stone, where it is much used in building. It is so soft while in the earth; that it is usually cut into a proper form on the spot, for afterwards it be-

comes confiderably hard. Williams anatomic it dud

The Hard Greyish SAND-STONE is composed of grit of an oblong angular shape, many of which are purely crystalline, and very bright and glittering when viewed through a microscope; but to the naked eye they appear like shining specks scattered here and there. The grits themselves do not at all cohere, but are comented together by an earthy spar. It will not crumble when broken into small pieces, nor is it at all dusty; likewise water poured on it penetrates its substance very slowly. It will not strike fire with steel, though it cut with some difficulty; but it will make a violent effervescence with aqua fortis, and burn to a white. This is what is called in London, Purbeck Stone, and there are often shells con-

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178 The NATURAL HISTORY of

tained therein. It is a good stone for building, but

will take no great polish.

The Brittle Brownish White SAND-STONE is very coarfe, rough and of a loose texture, being somewhat porous. It consists of a large angular grit. flightly cemented together by an earthy spar; when reduced to small pieces it readily crumbles between the fingers, and sticks to the hands. Water will penetrate it very freely, and therefore it is no wonder it will not strike fire with steel; but it makes a violent effervescence with aqua fortis, and burns to a pale reddish white. It is common in many parts of the kingdom; but it is chiefly brought to London from Portland, where it is much made use of in building, because it will stand the weather, though it cuts very eafily:

The Brittle SAND-STONE, with a round grit, is known by the name of the Kettering Stone, though it is not only found about that town in Northamptonshire, but at Ketton in Rutlandsbire. It is of a loose texture, and feems to be porous when broken, which is occasioned by the falling out of the inner part of its grit. It is pretty heavy, with but a little brightness, and consists of a roundish grit laid very closely together, as well as cemented by an earthy spar. In fmall bits it will crumble between the fingers, but not flick to the hand. It will not frike fire with fleel, but it ferments violently with aqua fortis, and burns to a pale whitish colour. It is used in many places

for building.

The Greenish White Brittle SAND-STONE is coarse and dusty, and its particles cohere so slightly, that they are continually falling off in powder. It is of a loofe texture, though moderately heavy, and is full of glittering spangles of talc. The grit is pretty Jarge and angular, cemented by a very loose coarse earthy spar. Water poured thereon will readily pene trate through it, and it cuts very eafily. It will no firike fire with fleel, but it ferments violently with aqua fortis, and burns to a reddish white. It is common in all parts of England, and will bear fire bette than many harder flones. 1 100 30013 300

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WATERS, EARTHS, FOSSILS and MINERALS. 179

Hard Greenish White SAND-STONE is very hard, coarse and rough, though of a firm texture, and is spangled all over with broad glittering slakes of talc. In some places it is variegated with brown spots, and consists of large grit with irregular angles, lodged in a fort of crystalline cement. It is considerably hard in the mass; but small bits may be reduced to powder between the singers, and it sticks to the hands. It will not strike fire with steel, nor make any great fermentation with aqua fortis. It burns to a pale reddish white, cuts easily, and takes a pretty good polish. It is sometimes brought to London, where it is used in building.

The Brittle Yellowish Brown Glittering SAND-STONE is very coarse, and of a loose texture; but it is considerably heavy, and very full of fragments of talc. It consists of large angular grit, lodged in a dusty cementitious substance, is soft and brittle in the mass, and will crumble between the singers in small pieces. It will hardly strike sire with steel, and makes but a slight fermentation with aqua fortis. It is used in building, being cheap and easily cut.

The Brittle Pale Brown SAND-STONE is extremely coarse, rugged and rough. It is somewhat spungy and pretty heavy; but it has not so much talc as the former. It consists of oblong grits with obtuse angles, and is cemented by a sort of crystalline substance mixed with earth. It is soft and brittle in the mass, and is easily penetrated by water. It will not strike sire with steel, nor ferment with aqua fortis. It is common in the northern counties, where they make whet-stones of it, which are brought up to London, and much used by shoemakers; it also serves for grinding stones.

The Hard Red Glittering SAND-STONE is coarfe and rough, though of a very close firm texture, and will bear a pretty good polish. It is remarkably hard and heavy, and of a deep reddish brown colour, with glittering spangles of talc. It consists of large oblong angular grits cemented with a sparry substance. It cannot be rubbed to pieces between the singers, nor will water so much as penetrate its surface. It is cut

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with difficulty, and therefore it is no wonder it strikes fire with steel. It makes but a slight fermentation with aqua fortis, and undergoes little or no change in the fire. This is brought to England in targe quantities

from Norway. 18 18

The Hard Glittering SAND-STONE, of the colour of rufty iron, but fometimes more yellow and sometimes browner, is very beautifully spangled with talc. It consists of a small roundish grit, cemented by a sirm deep brown earth, and is remarkably hard even in the smallest pieces, but will not strike fire with steel, though it cuts with great difficulty; nor will it ferment with aqua fortis, though it burns to a deep chocolate colour. It is very plentiful near Bristol, where there are strata twenty feet thick. It stands the weather very well, and is used in some places for building.

The Soft Brittle SAND-STONE, of a brownish rusty colour, is composed of large roundish grit, cemented with a loose ferruginous earth. It is common in most counties of England, and is of little or no use.

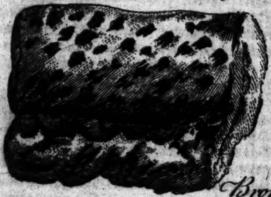
The Grey Brittle Dull SAND-STONE confifts of large, coarle, obtufely angular grits, cemented by a lcose earthy spar. It is very fost and brittle in the mass, and much more so when reduced to small pieces. It will readily split into horizontal plates, and burns to a pale whitish red. It will not readily strike size with steel, but ferments greatly with aqua fortis. It will not stand the weather very well; being very apt to crumble after hard frosts, though in some places they cover their houses with it instead of tiles.

The Brownish White Glittering SAND-STONE has a moderately smooth and even texture, and is pretty firm, compact and heavy, but varies in contour on account of the earthy particles that get into the pores of this stone with the water. It is the most bright and glittering of any stone of this kind, and is commonly known by the name of the Flag-stone. It is always found in stat plates from a quarter of an inch to four or sive inches thick, and the thinness of these always lie uppermost. It is considerably hard, and will not break in any direction. It will not easily strike

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WATERS, BARTHS! FOSSILS and MINERALS. 181

frike fire with feel; but ferments briskly with aqua fortis, and burns to a greyish white. It is used in the north of England for covering houses instead of tiles; that is, those of the thin fort, for the thicker are employed in paving and building. It confilts of grit with blunt angles, cemented with an earthy spar, and interspersed with flakes of bright tale lying in a horizontal direction.

The Greenish Grey Shining SAND-STONE is of a hard, coarfe, rough and somewhat spungy texture; but is confiderably heavy, and full of bright glittering spangles. It consists of large angular grit that lie very close together, among which are dispersed great numbers of fine small very bright flakes of tale, which, with the grit, are cemented with a small quantity of a very pure transparent substance. It will readily split in a horizontal direction, but not into very thin flakes. It does not readily strike fire with feel, and makes but a flight fermentation with aqua fortis. It is used in some places for covering of houses.

The Yellowish Grey Glittering SAND-STONE fomewhat refembles the former; but is very rough, coarfe and harsh, and considerably heavy. It is met

with in many parts of France. The state of t

The Hard Purple and White Laminated SAND-STONE is the hardest and most elegant of this class, though very rough and harsh. It is of a very close texture, extremely heavy, and the colour is finely variegated with greyish white and purple. The plates or flakes are much thicker than many of the former, and is extremely bright and glittering, on account of the large quantity of talc contained therein. It folits very eafily, and is composed of fine glittering grit, cemented with a pure shining substance. It is extremely hard, and confequently with firike fire with feel; but it will not ferment with aqua fortis. It is common in Italy, where it is used for pavements.

The Blueish Glittering SLATE-STONE is pretty hne and smooth, and of a close compact texture. It 18 extremely heavy, and full of talky particles, and more eafily cleaves into plates than any of the former, which are generally about one tenth of an inch thick. It con-

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182 The NATURAL HISTORY of

fifts of small irregular sharp grit, that is often entirely blended with the cement, which is of the same crystalline substance with itself, though debased by a mixture of earthy particles. It is extremely hard, strikes fire with steel, and ferments slightly with aqua-

fortis! This stone is common in Italy, yas muld dis

The Denfe Dull Whitish ROCK STONE is moderately sine, but of a very irregular texture. It is composed of a soft whitish earthy spar, intersected with flat plates of the crystalline sort. The earthy part of this stone is pretty dense, but not so hard as the crystalline, and there is no grit of any kind. It ferments greatly with aqua fortis, and burns to a blueish white, mixed with a little red. This is very common in many counties, and is brought to London from different places, where it is used in building.

The Hard Greyish White Dull ROCK-STONE is of a compact texture, with a smooth surface, and is considerably heavy. It is composed of no visible grit, and is easily cut; it will not readily strike fire with steel, but serments violently with aqua fortis. It is common in several counties of England, is used in buildings, and stands the weather pretty well: some

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burn it into a poor coarse fort of lime.

The Hard Porous ROCK-STONE is of a coarse spungy texture, and yet very hard and heavy. It is generally of a greyish white, though sometimes brownish, yellowish or black, from the different kinds of earthy particles falling into it with the rain. It has no grit, and is very hard, even so much as to spoil the workmens tools. It strikes fire with steel, but will not ferment with aqua fortis. It is common in York-shire, where the strata lie very deep. It is used for building in that county.

The Hard Bright Grey ROCK-STONE is more like crystal to the naked eye than the former, and confists altogether of a sparry substance. It is a very elegant beautiful stone, for it is bright, shining, and very heavy. It will hardly strike fire with steel, but ferments violently with aqua fortis, and burns to a pale blueish red. It is not very common; but there is some

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WATERS, BARTHS, FOSSILS, and MINERALS. 183 of it in Yorksbire, where they both use it for building

and for burning into lime.

The Hard Bright Brownish White ROCK-STONE is very heavy, and of a close texture, consisting of a crystalline spar, which in thin plates is a little transparent. It will not strike fire with steel; but ferments very briskly with aqua fortis, and burns to a pale whitish red. It is brought from Purbeck to London, where it is used for building and pavements. It is also used in Northamptonshire for building and making tomb-stones.

The Dull Yellowish White Hard ROCK-STONE has a close firm texture, with an irregular surface, and is very heavy. It is of a pale dull white, with pale yellow veins and spots in several places; but it is not bright, though composed of crystalline spar. It will not easily strike fire with steel, but serments violently with aqua fortis, and burns to a white colour. It is common in Dersetsbire, and sometimes contains shells. It is very useful in building, because it bears the weather very well.

The Dull Hard Brownish White ROCK-STONE generally consists of above half shells, and is a very coarse harsh stone without any brightness. It will not readily strike fire with steel, but ferments violently with aqua fortis, and burns to a greyish white. It is brought in great quantities from Purbeck to London,

where it is used for flat pavements.

The Whitish Grey Marble ROCK-STONE is confiderably fine, remarkably heavy, and of a fine firm texture. It has a somewhat sparkling appearance, and is entirely without shells. It is considerably hard, and will bear a pretty good polish; it strikes fire with steel, but will not ferment with aqua fortis. It is found in the Eastern countries, as well as Italy, and some parts of Germany.

The Yellowish White Flinty ROCK-STONE is very fine, smooth and glossy, and its texture is pretty much like that of common flint. It will hardly strike fire with steel, but makes a very great and lasting fermentation with aqua fortis, and burns to a greyish or blueish white. It is common in some parts of England,

and

and is known by the name of the Rag-ftone and Lime stone. It is generally free from clefts; but when there are any, the fides are always covered with a cryfalline spar. It is used in the pavements of streets.

The Brownish White Flinty ROCK-STONE is in fome parts of England called Chert or Wern, has a very compact firm texture, and is confiderably heavy. It has fometimes veins and spots of red, white or black. It breaks with an even gloffy furface, like that of flinty pebbles; and firikes fire with feel, but makes no fermentation with aqua fortis. It is often found among other firata of stone, and Dr. Woodward mentions one of three feet thick in Yorkshire.

The Blueish Flinty ROCK-STONE is very foft and smooth, with a close even texture, and is considerably heavy and hard. It has fometimes blueish white veins, and is found in most counties of England. It firikes fire with feel with fome difficulty, and makes a firong and lafting fermentation with aqua fortis. In fome places it is burnt into lime, which is very good.

The Hard Blueish ROCK-STONE is very rough, and is generally full of shells or spar. Its texture is firm, and is extremely heavy; it will not readily firike fire with seel, but ferments violently with aqua fortis, and burns to a pale whitish grey. It is brought from Purbeck to London, where it is used in pavements. It is hard to cut, and therefore not much used in building.

The Brownish Blue Dull Hard ROCK-STONE is coarfe and rough, and pretty heavy. It is generally variegated with lines and fpots of a pale red and of an opaque white. It will not strike fire with steel, but makes a strong and lasting fermentation with aqua fortis, and burns to a pale blueish white. It is called in Leicestersbire the Blue Lime-stone, for it makes good

The Dull Pale Red ROCK-STONE is pretty fine and smooth, of a firm texture, and confiderably heavy. It is variegated in most places with lines and spots of a pale red, or of an opaque white. It will not readily ftrike fire with fleel, but ferments violently with aqua fortis, and burns to a very pale whitish or greyish red.

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WATERS, EARTHS, FOSSILS, and MINERALS. 185 It is used for building walls in some places, and is also burnt to lime.

The Hard Shining Red ROCK-STONE is very heavy, and is spangled in many places with small bits of a very glossy spar. It is extremely hard, and will take a good polish; it will not readily strike fire with sheel, but serments violently with aqua fortis, and burns to a pale red. It is imported from Sweden, Norway and Denmark, and is used in pavements; it is also to be met with in Yorksbire. That of Norway contains sine straight shells, but that in England is without them.

The Green and Red Variegated ROCK-STONE has a rude irregular structure, and is but coarse for one of this class. However, it is not porous, is pretty heavy, and interspersed with blotches and soft uneven lines of a fine paler green spar, as well as a few fragments of a white and semi-transparent one. It is found in the lead mines of Derbysbire; but is of no use.

The Hard Black Dull ROCK-STONE has a close firm texture with a smooth surface, is pretty heavy, and extremely hard; but has no gloss, except a sew shining specks in some places. It is not unlike black marble, but will not readily strike fire with steel: it ferments violently with aqua fortis, and burns to a fine blueish white. In Leicestersbire it is burnt into sime.

The Hard Black Shining ROCK-STONE is formewhat coarse, but extremely hard, very glittering, and remarkably heavy. It does not ferment with aqua fortis, and burns to a pale brownish red. It is found

in Derbysbire, but is hitherto of no use.

The Soft Dull Black ROCK-STONE has a pretty smooth surface, but no very firm texture, and though very heavy, has not the least brightness. It has somewhat the appearance of slate, though it will not cleave; nor will it strike fire with steel, nor yet ferment with aqua fortis. This is known every where by the name of Rag-Stone, and is more properly so called than the yellowish white one before mentioned, because when broken it has a ragged appearance. This is used as a whetstone all over England, for common knives and carpenters tools.

CHAP. XXIV.

OF SLATES.

THE Brittle White SLATE-STONE has a pretty close texture, and is considerably heavy, though dull. It consists of various plates from one sixth of an inch to an inch thick, and will split pretty easily. It will not strike fire with steel, and ferments strongly with aqua fortis. It is very common in England, and particularly in Northamptonshire, where it lies near the surface of the ground. It is made use of to cover houses.

The Purple SLATE is a fine beautiful kind, and is pretty heavy. It is firm and compact, and the colour is a fine pale purple, glittering all over with small glossy spangles, which are very bright, and so minute that they are not to be seen distinctly without a careful examination. It consists of very thin plates or slakes laid evenly upon each other. It will not strike fire with steel, nor ferment with aqua fortis; but is greatly valued as a covering for houses in the northern counties of England, where it is found.

The Common Blue SLATE is almost universally known, and is a very useful stone. The texture is sine and smooth, and consists of even plates laid close upon each other, which will readily split. It will not strike fire with steel, nor ferment with aqua fortis. It is used almost all over England for covering of houses,

and is much better than tiles.

The Brownish Blue Brittle COAL-SLATE, which is always to be met with in coal-pits, is of no manner

of use.

The Greyish Black Brittle SLATE, by some called SHIVER, is of a very loose open texture, though pretty heavy; but the structure is regularly plated, and the plates seldom cohere to each other. It is very soft, and is readily penetrated by water. It will not ferment with aqua fortis, and burns to a faint red. It is common in the northern counties of England, and is made use of for manuring land, in the same manner as marl.

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WATERS, EARTHS, FOSSILS, and MINERALS. 187

The Greyish Blue Sparkling SLATE has a very compact texture, but somewhat uneven, and consists of irregular plates, which will split into those that are very thin. When large masses are sound, they are often bent and undulated, and towards the upper part of the stratum are frequently observed to be desective. They are composed of regular oblong fibres, which are all very bright and glittering when the mass is just broken, having somewhat of the appearance of talc. It will not strike sire with steel, nor ferment with aqua fortis; but burns to a yellow spangled mass. There are large strata of this in some of the counties of England, and is sometimes found on the sea-shore. It is often used as a whetstone to give a good edge to tools.

The Irish SLATE is the most soft and brittle of all this class, it being coarse, rough, and of a crumbly texture; but is pretty heavy, and of a brownish black. It consists of a multitude of thin plates laid evenly upon each other, and splits very easily. It will not strike fire with steel, nor ferment with aqua fortis; but will burn to a strong bright red. It is somewhat of the nature of alum, and is very common in Ireland; it is also found in Somersetsbire and other parts of England, where it always lies near the surface of the ground in a very thick stratum. It is used in medicine against bruises, and is given by some from one dram to two in curing quartan agues; but its principal use is for internal bleedings.

At Isleb, in the county of Mansfield, there is found a black Slate, which has the images of various fishes of a black or yellow colour; and they appear to be so finely done, that the very scales may be seen.



Of MARBLES.

THE PARIAN MARBLE is so called because it was brought from the island of Paros. It is of a white colour, extremely hard, and takes a very

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fine polish. It has a firm, compact, close texture, and is considerably heavy; its extraordinary white-ness has sometimes a blueish cast, with blue streaks of different breadths. It is not very hard to cut, and therefore is in great esteem among the statuaries. It consists of pretty large particles with flat surfaces, but much smaller and more regular in their size and shape than those of the alabaster kind. It will not strike sire with steel, but serments violently with aqua fortis, and when burnt is almost as white as snow. Some say this marble receives its name from Agoracritus Parius, who sirst carved a statue of Venus out of it.

The Hard White MARBLE, called Carrara by the moderns, is whiter than the Parian, but is not of so great value, because it is more hard to cut, and will not take a fine polish; however, it is used for building, as well as to make statues. It has a more sirm and close texture than the former, and is very heavy; besides, it has greater transparency than any other white marble. It consists of small glittering particles, many of which appear to have flat surfaces, and consequently lie close together; and it is supposed to consist of a perfectly white spar. It will not strike fire with seel, but ferments violently with aqua sortis, and burns to a pure white. This marble is found in Italy, from which country large quantities are brought to England.

The Hard Pale Yellow Glossy MARBLE is of the same colour throughout, and is considerably heavy, with a close firm texture. It is very fine and smooth, and between the colour of honey and Venice turpentine. It will readily break in any direction into a smooth glossy surface. It will not strike fire with steel, nor ferment greatly with aqua fortis; but burns to a fine pale red.

The Numidian MARBLE of the antients is hard, shining, of a blueish colour, and is very remarkable for its hardness. It will bear an extremely fine polish, on account of its compact even texture. It is not at all transparent, unless in very thin pieces. It will not strike with steel, but ferments greatly with aqua fortis, and burns to a pure white. It is found in

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WATERS, EARTHS, FOSSILS, and MINERALS. 189

Italy, Spain, France and Germany, and is a fine strong, durable marble, though not in great effeem.

The Black Namur MARBLE is very fine and smooth, having a close firm texture, and is very heavy. It is full of fine small glossy particles, which look like so many spangles. It will not strike fire with steel, but ferments violently with aqua fortis, and burns to a pure white. It is a useful marble, though not

much efteemed.

The Chian MARBLE is of a black colour, and very fine and hard. It is used in England, as well as in other places, for a touch-stone; and is in great esteem with the goldsmiths for that use, it being the best of this kind. It is perfectly smooth when broken, but is very dull, and does not shine at all. It appears to be one pure, unmixed mass; and cuts with dissiculty, but very smoothly. It will not strike fire with steel, but ferments very strongly with aqua fortis, and calcines to a pure white. It was formerly brought from the Island of Chies; but we have it now from Italy. It is capable of a very high polish, insomuch that

it has been used instead of a mirrour.

The Lydian STONE of the antients is a hard black Marble, in the shape of columns, and is called Bafaltes by Boet. It is reckoned among the Marbles by Pliny; and indeed it is the hardest of this kind, for a file will not touch it. It is also called Bafanus, from a Greek word that fignifies to examine, because this was the touch-stone of the antients. It is now met with in various parts of Germany, and particularly in Silefia; but the greatest quantity of it known is the Giants Causeway in Ireland, which appears fo regular that it was at first taken to be a work of art. This Marble is of a very fine, fmooth, even texture, and of so gloffy a black that it resembles high-polished steel, without any foreign matter. It is always found in one smooth homogene mass, but not in quarries like other Marbles; for it always stands upright in regular columns, confishing of a great many joints, one of which is exaftly placed and fitted to the other. A vast number of these are so regularly put together, and joined by their ides, that they feem to have been placed fo by a very **fkilful**

190 The NATURAL HISTORY of

fkilful workman. Many of these columns make large pillars, some of which are at small distances from each other. The single columns are all angular, and consist of from four to seven angles; but the first are most uncommon. It will not strike fire with sleel, which must be on account of its smoothness, for it is certainly hard enough for that purpose; likewise it makes little or no fermentation with aqua fortis. This shone may be made use of on various occasions, and is well known to make the very best kind of burnish-

ers for polishing filver.

The Lacedemonian MARBLE of the ancients is of the green kind, and is taken notice of by Pliny. It is different from the Ophites, because that is variegated with spots like serpents, from whence it took its name, for that word fignifies a ferpent; befides, the columns that are made with this last are always very fmall. There is also another of this kind, of a dark green, which is finely painted with croffes of a lighter colour, which are fo fine that common spectators would take them for the effect of art. This Marble has a close compact texture, and is very hard and heavy. It is of a fine bright green, and takes a very good polish. It will not strike fire with steel, but ferments violently with aqua fortis, and burns to a pure white. It was first brought from Lacedemonia, afterwards from Egypt, and is now found in Germany, Squeden, and England. There is faid to be a firatum of it near Briffel, and many in Wales, where it may be had in any quantity.

The Derbyshire MARBLE is of a whitish brown colour, and has a fine close texture. It will not strike fire with steel, but ferments violently with aqua fortis, and burns to a pure white. It is so full of marine substances, that four fifths of the whole mass seem to be composed thereof; it is particularly sull of entrochi, which are a fort of shell of an oblong round form, surrowed on the outside, as if it was divided into joints, marked with a star at the end, which are supposed to be part of the Star Fish; but this is uncertain. They are of all sizes, from the thickness of a large pin, to half an inch or more.

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WATERS, BARTHS, POSSILS, and MINERALS. 191:

They will take a very elegant polish in the mass, and are much used for chimney-pieces, tables, and the like. It is found in vast quantities in Derbysbire, and some will not allow it to be Marble, but call it the

Derbyfbire Stone . There are son I' . rallomit ted . ramine

The Green MARBLE, thick fet with small fea shells, is of a very beautiful kind, and will bear a very fine polish. It is of a delightful bright green; but does not sparkle. The roundish black lines, and pale brownish white specks that are found in it, are thought to be small sea shells, filled up with an impure white earthy opaque spar; but, be that as it will, it is a very elegant curious Marble. It ferments violently with aqua fortis, and calcines to a pure white. There are very large quarries of it in Germany, Bohemia, and some parts of France, where it is used in the ornamental parts of buildings.

The Greyish Green MARBLE, thinly set with shells, is somewhat coarse and rough, and of an irregular and pretty sirm texture, moderately heavy, and considerably hard. It is of a dull dusky greyish green colour, and will ferment violently with aquastortis. It is found in Derbyshire, Dorsetshire, and

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The Hard Greyish Black CORALLOIDE MAR-BLE has a very fine smooth even texture, and is confiderably bright and sparkling; but does not feem to confift of a homogene mass when broken, but of many closely-compacted particles. It abounds with a fort of coral called Porus, fet at small distances and in all directions: they are generally about an inch and a half long, and three quarters of an inch broad, and are composed of longitudinal plates, which are very fine, thin, and of a fnow-white colour. In the most perfect specimens there are processes like wings, of a close irregular net-like texture, expanded on each fide near the top, and of this fort of texture the whole body is full; the interffices are filled up with a greyish white spar, and form a very beautiful figure. It is found in great plenty in Derbysbire, and according to Dr. Woodward in Wales. The tomb of Sir Thomas Gresham in Great St. Hellen's church is built with it.

192 The NATURAL HISTORY OF

The Black CORALLOIDE, marbled with shells, is of a very close firm even texture, and is very hard and pretty heavy; it will bear a very fine polish. It is variegated with a Coralbide Porus not unlike the former, but smaller. There are also great numbers of large sea shells, of the turbinated and bivalved kinds, lodged in various directions, and of a clear bright white. The cavity of the porus and shells are all silled up with the black substance of the marble; but they retain their shape in a very perfect manner. It ferments violently with aqua fortis, and is common in

Ireland, from whence it is brought to London.

The Purple and White Variegated MARBLE is generally pretty fine, with white veins, fpotted and variegated with purple. In fome blocks the purple makes the ground, and the veins and spots are white: there are also blotches of other colours, as pale red, pale brown, yellowish, greenish, and yellowish brown. The different substances, which compose this Marble, are generally diffinet maffes, particularly those of the purple and white kind. The whitest is most pure, and therefore is hardelt, brighteft, and most transparent. The pale red is next, the purple next to that; but the brownish, greenish, and yellowish, are very earthy, and almost perfectly opaque. There are filvery partieles in this Marble, which are supposed to be a very pure spar. This is a common Marble in Italy, and great quantities of it are brought to Eng-

The Brown and White Brittle MARBLE is the foftest of this class, and has a pretty coarse texture; but it is considerably heavy, and of a pure snow white, sinely variegated with slender lines, and veins of a deep brown earthy colour, and in some places there is a faint cast of pale red: when broken, glittering particles appear as in the former, which are disposed in small slakes. The white parts or ground are extremely like the finest loaf-sugar, and is so soft that it may be cut with a knife. Water will readily soak through it, and it makes a violent effervescence with aqua sortis. It is common in Italy, and serves to make chimney-pieces.

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WATERS, EARTHS, Fossils, and MINERALS. 193'

Hard Variegated Red and White MARBLE is very fine, remarkably heavy, and is somewhat of a blueish ground, finely variegated with red brown and yellow veins. It is very glittering in many parts, and will take a very fine polish. It will not strike fire with steel, nor ferment greatly with aqua fortis. It is a beautiful Marble, and is found in great plenty in

Devonshire, from whence it is fent to London.

The Blue and White Variegated MARBLE has a large rough grain, is moderately heavy, and is of a blueish white, or of a fine bright pearl colour, variegated with broad veins of a dusky blue, which often make up the greatest part of the Marble. The white parts when broken appear bright and sparkling, but their texture is loose. The blue is of a smooth texture, and extremely dull. It is moderately hard, and takes a very good polish. It ferments violently with aqua fortis, and burns to a greyish white. It is common in Italy, from whence large quantities are brought to England, where it is used for monuments.

The Pale Brown MARBLE, with white and red veins, has great variations, both with regard to the ground and the veins. The texture is pretty fine, close and smooth, and is considerably heavy. The veins are sometimes of a blueish white, without any other mixture, and in some they are only red. The red is of all degrees, from the brightest colour to the purple of porphyry. It is considerably hard, and takes a very beautiful polish. It ferments violently with aqua fortis, especially in the red and white veins. It is a common English Marble, and there is great plenty of it in Cornewal, Devonshire, and Wales. It is used

in London for tables.

The Brown MARBLE variegated with white and black is pretty fine and smooth, though subject to tracks and flaws. It is moderately heavy, and the brown colour is variegated with very beautiful whitish and black branded veins of various figures: sometimes it is difficult to determine whether the white or rown is the ground. The brown is of different detections of colour, and is disposed in a very odd manner; it is sometimes, when black, seems to resemble rocks, Vol. V.

194 The NATURAL HISTORY of

clouds, rivers and landscapes. It is common in many parts of Italy, where it is in good effect for ornamental works.

The Hard Brown MARBLE, variegated with white, is the hardest of this class, and is remarkably heavy. It generally confifts of only two colours, yellowith brown, and a dulky white; but they are in many different proportions, and the veins are composed of very different shades, which generally resemble the windings of rivers, and feldom any thing elfe. It ferments but little with agua fortis, nor will it readily calcine; it is very hard to work, therefore is not much in use; it is found in Italy, but not very common.

The Yellow and Purple Variegated MARBLE is a very curious kind, and the ground is of a beautiful pale yellow, with fine purple veins; there are others that are dark brownish, blackish and white. The ftructure is smooth and even, and it will bear a very elegant polish. It will ferment somewhat briskly with aqua fortis; and when calcined turns to a beautiful pale red. It is found in Italy, and with us bears a

very great price.

The Blue and Yellow Variegated MARBLE would be very valuable, if it would admit of a fine polifi; but, as it does not, it is not in great esteem. The ground, which is coarse, is of a deep yellow, mixed with a fine blue; which in fome places is fo deep as to be almost black, and in other places so light that it looks like a pale grey. Its texture is loofe and open, and it is common in Spain, Italy, and Africa.

The Black MARBLE, with white veins, has a very firm texture, and is of a fine deep black, variegated with narrow white veins, running generally straigh and even. It is pretty hard, and will bear a good polish, and when broken one way it is very bright and sparkling. It ferments but little with aqua fortis, and calcines to a dulky grey : it is common in Italy, and is used with us for chimneys and tables.

The Blueish Black Hard MARBLE, with fnow white veins, has a somewhat rough and harsh texture but is confiderably hard, and will bear an excellen polish. It is somewhat bright and glittering whe

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WATERS, EARTHS, FORSIES and MINERALS, 100

broken in the black part, and the white veins glitter greatly. It ferments violently with area fortis, and when calcined is of a mixed grey. It is common in

Italy, and is brought to us from Legborn.

The Black and Vellow Variegated MARBLE has a very fine close texture, and is very heavy The black is deep, and variegated with a great number of yellow veins. It will bear a very fine polifh, and then the yellow veins look like gold; but, when there is any white, they appear like filver. There are great quantities of this Marble brought from Italy, because it is of very great ale with us, and highly effeemed.

The black MARBLE, with white and red veins, is of an irregular but close texture, and is confiderably heavy. The ground is black, and fometimes inclines to blue, and the variegations are chiefly of a clear bright white; but there are fome of a beautiful red. Sometimes the white part is fo great, that it is hard to determine whether the white or black is the ground. The red veins commonly appear of a granulated fructure, and the whole is very hard, and will bear a very fine polish. It will not firike fire with steel but ferments pretty briskly with agua fortis, and burns to a mixed grey. There is a great deal of this Marble in Ireland, from whence it is sometimes brought, the very rarely and han about a small districtions of the

The Black MARBLE, with red, white and yellow veins, is pretty coarse and rough, though of a firm texture. The ground is of a deep black, which is beautifully variegated with all degrees of red, yellow and white, dispersed in irregular veins. It is brightest in the white part, and the red and black fparkle, though very little; but in the red it is scarcely perceivable. It takes a pretty good polish, and ferments though but little with aqua fortis, except in the white

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veins. Remoil istronomy to march the long land, marriaged The Green MARBLE, variegated with white veins, was in much effect with the antient Romans. It has a firm compact texture, is remarkably heavy, and green and white are of such different degrees, that they make a very agreeable variegation. Befides thefe, there are spots and veins of a blackish colour, and the

106 The NATURAL HISTORY of

whole is fo hard that it will bear a pretty good polish. It ferments briskly with aqua fortis, except where it is green and flaky; and is brought from Egypt and other deep a respect to

The Greenish Black and White Spotted MARBLE is the black Ophites or Serpent-Stone of the antients. It was fo called because it had spots in the form of ferpents; for the name was owing to the figure of the spots and lines, and not of the stone itself. It is a very beautiful and pretty hard marble, of a firm texture, and remarkably heavy; the ground is a very fine green, variegated with fmall black spots and irregular lines, and fometimes with those that are white. They are fometimes pretty large, and half blended with the general substance of the mass, and sometimes there is the blush of purple throughout the whole. It ferments violently with agua fortis, and burns to a mottled grey. This marble is now found in various parts of the world, and particularly in the islands of the Archipelago; there is also a fort of it in Wales, which is known by the name of the Anglesea Marble.

The Greenish Soft MARBLE, variegated with white and black veins and fpots, is the white Ophites of the antients. It is of a pretty fine fmooth texture, moderately heavy, and, when pure, of a very elegant pale green, with spots, clouds and lines of a fine deep black and whitish green, which is sometimes entirely white. It is foft and eafily cut, but looks very, bright when wrought. It ferments violently with aqua fortis, and burns to a dulky grey. It is found

in France, Italy and Germany.

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The Ash-coloured MARBLE, with small black spots, is the Tephria and grey Ophites of the antients. It is a fine smooth marble, pretty firm and compact, and confiderably heavy. The ash colour is lively and beautiful, the black spots of irregular figures, and the fixth part of an inch in length. It is pretty hard, and takes a fine polish. There is a great deal of this in Germany, but it is not fo good as that of the antients, which is brought from Ethiopia and Egypt.

The Greyish Brown MARBLE, with bright green spots, has an even texture, is confiderably firm, and

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WATERS, BARTHS, FOSSILS and MINERALS. 107

very heavy. The fpots are small, generally of an oblong figure, and will take a very fine polifh. The green parts especially ferment greatly with aqua fortis, and. burn to a pale mottled grey. It is common in Egypt and Arabia, and is faid to be met with in England;

The pale grey MARBLE, with green spots and veins, is extremely firm and very heavy, and in some places flightly tinged with a very faint red, and in others with a colour that is nearly white. It is variegated with a very beautiful pale green, confisting of imall oblong irregular spots, and tometimes of narrowuneven veins. It is very heavy, and will bear a beautiful polish. It is common in Germany, and Dr. Woodward takes notice of a specimen found on the sea hore in Gornavall.

The Red MARBLE, with white and gold veins, is the Theban marble of the antients. It is a very beautiful marble, and of a very smooth regular texture. The red is variegated in some places only with white, and in others only with yellow or gold colour; these are very large and broad in some places, and very narrow in others, for they generally make upalmost half the mass. It is found in Egypt, Italy, Germany and England; but the Egyptian is the finest, and the English the worst.



CHAP. XXVI.

Of ALABASTER, PORPHYRY and GRANITE

THE Snow-white Shining ALABASTER is that called the Lygdine by the antients. It is not very compact; but is heavy, and confifts of a multitude of broad, flat, large particles, which are very bright and perfectly white. It cuts very freely, and is capable of a fine polish. There are very large strata of it in Arabia, Egypt, and many parts of Italy; but it is seldom brought over to England.

Whitish Yellow ALABASTER, of a fost confistence, is of a loofe open texture, confiderably heavy.

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and nearly of the colour of honey; but the colour is more deep in some places than others. It consists of irregular pieces that lie in tables one over another, though with regularity; however, they all together compose a remarkably bright mass, which is very brittle. It is found in Cappadocia; and has been met with in Germany and France, as well as in Derbysitive.

Yellowish and Reddish Variegated ALABASTER is the common Alabatter of the antients. It is fo foft that it may be cut with a knife, and has the fame name in all languages. It is remarkably bright, glittering and almost transparent, and its texture is very loofe and open, though it is moderately heavy. The ground is of a fine clear pale yellow, between that of honey and amber, and has the fame texture as the former; but is beautifully variegated with crooked undulated veins, fome of which are broad, and others narrow; fome of a pale red, others whitish, and others again of a very agreeable pale brown. It will bear a very fine polith, and confilts of large angular sparry concretions, It is not proof against water, ferments violently with aqua fortis; and burns to a pale grey colour. It was formerly found in Egypt, and is now met with in many parts of England.

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Purple PORPHYRY, with pale red and white spots, is the Porphyry of the antients, by whom it was placed among the red marbles, of which it was reckoned the chief, on account of its hardness and splendor. It is named Porfido by the Italians, and there are two columns of it before the gates of St. John Baptift, in Florence. The texture is not fo fine as many of the common marbles, and it always breaks with a rough irregular furface; but is remarkably firm, compact and heavy, and of a fine deep purple variegated more or less with pale red and white spots, as also a sew flaky black spots. The purple is of all degrees, from the colour of claret to that of a violet, and the variegations are generally distinct spots of various fizes. It approaches the nearest to the hardness of a gem, and was always in very high efteem. It is found in great plenty in Egypt, which was always famous for this ftone ;

WATERS, EARTHS, FOSSILS and MINERAUS. 199

fione; but now it is met with in other places, at least with variations. They will all strike fire with steel, but will not ferment with aqua fortis. This is frequently made use of as a stone for grinding colours.

The PORPHYRY of the colour of red lead, varie gated with black, white and green, has the hardness and all the other characters of purple Porphyry; but it excels it in brightness, and in the beautiful variegations of the colours. The texture is harfly rough and irregular, but it is remarkably heavy. The ground is of a bright red lead colour, and in various degrees. It has very regular green veins, and fome that are perfectly white, with a great number of small black fpecks; but these are never mixed with the green, that make a confiderable part of the whole. It takes an exceeding fine polish, strikes fire with ficel, and will not ferment with aqua fortis. It is found in the island of Minorca, and this might serve for many valuable purposes, if it was imported into . England.

The Pale Red PORPHYRY, variegated with black, white, and green, is of a very compact firm texture, considerably heavy, and of a pale sless colour, often approaching to white. The variegations are in large blotches from half an inch to an inch broad, and now and then disposed in irregular veins. The surface is bright, but does not glitter, and its extreme hardness renders it capable of a very high polish. The red, white and green parts appear to be all tabulated, and the green has a tinge like that of gems, and is the brightest of all, it being nearly transparent. It is found in Arabia Petrasa, and in Upper Egypt. There are also small pieces of it in Germany and Ireland, and they have been sometimes seen in Devonshire on the

fea shore.

The Hard White GRANITE, with black spots, called in Cornwal Moor-stone, is of a large and gross texture, and appears to be a rude, but beautiful mass of variously constructed and differently coloured particles, distinct from each other, though they cohere very strongly. It is considerably hard, and mottled with black and white, among which there are perfectly transparent particles that are very bright; there

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are great numbers perfectly black, and others of the colour of brown crystal: fome of these intersect, and are divided by other granulæ; but others lie parallel with, and others evenly upon them; and others again are quite buried in the substance of the crystalline particles, like flies in amber. Some again are fingle and thin plates, and others large and broad laid fingly on each other. The whole is extremely bright and glittering, and will take a pretty good polish. It strikes fire with steel, but will not ferment with aqua fortis, and undergoes little change in the fire. There are vast quantities of this in some parts of Ireland, as well as in Cornwal and Devenshire, where it is found in exceeding large maffes on the furface of the ground. It is used in London for the steps of publick buildings.

The exceeding Hard Red GRANITE, variegated with white and black, is the Syenites of Pliny, and the Oriental Granite of the moderns. It is called by the Italians Granito Rosso, and of this the obelisks are generally made in Egypt. Travellers tell us of an obelisk, in Alexandria, made of one solid block of this Marble, which measures eighty seet in height. The texture of this Granite is coarse, harsh and rough, but extremely heavy. It is of a very beautiful pale red, variegated with white and black. All parts of it are bright and glittering, being capable of a very sine polish. It strikes fire with steel, but will not ferment

with aqua fortis.

The Pale Whitish GRANITE, variegated with black and yellow, is found in the illand of Minorca, where there are vast quantities of it. It is often found on the shores of the island of Guernsey, and is used for payements in the streets of London.



CHAP. XXVII.

Of Common Circumscribed STONES.

THE Brown STONE, grey on the outside and divided by partitions, has a very firm compact even texture, with a smooth surface. It is of various sizes,

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WATERS, EARTHS, FOSSILS, and MINERALS, 201:

fizes, but generally between fix and twelve inches in diameter. They are not always of the fame shape. but are most commonly roundish, or inclining thereto. They have always a multitude of fine flaws like those of common flints, which chiefly appear upon breaking them; and they always break in thefe flaws, which are lined on both fides with an extremely thick crust of grey clay. Befides thefe narrow cracks, there were originally others, which are now filled up with a pure spar of a pale yellowish white, and pretty transparent. These are always thickest in the centre of the stone. and become thinner and narrower as they approach the furface. The stony matter of this kind is confiderably heavy, moderately hard, and will bear a flight polish. It will not ftrike fire with fleel; but ferments violently with aqua fortis, and turns to a whiter colour in the fire; the matter, which dis vides the feveral parts, burns to a pure white. It is very common in England, and fometimes contains hells, besides a beautiful delineation of shrubs, plants, and moffes.

The Hard Brown STONE, with few divisions, has not a grey crust like the former, but the colour within! is nearly the same. The texture is firm, but the furface rough and irregular; and the usual fize is from four to twelve inches in diameter. The shape is different, but it has always somewhat of an oval; and when broken there are finall thining sparry specks. The divisions or septa are very few, which appear in the form of fhining veins; and there are forme that have none at all. It will not firike fire with fleel, but: ferments greatly with aqua fortis, and calcines to a greyish white. It is common in the clay pits between London and Illington.

The Hard Blackish Brown STONE, with whitish partitions, is coarfer than the former; but the texture is firm, and it breaks with a rugged uneven furface. It is feldom above fix or eight inches in diameter, and often no bigger than a hen's egg, but the shape is neary round. It is always covered with a pale brown trust, about the third of an inch thick, where it is ofter than within. The divisions are very numerous,

and always filled up with a whitish spar. The inside of the Stone is of a dusky brown, with irregular variegations of black. It is considerably heavy, and will take a pretty good polish. It will not strike fire with steel, but ferments with aqua fortis, and burns to a pale reddish white. It is found in most parts of England, and is common near London.

The Hard Brownish Yellow STONE, with yellowish white partitions, is very firm and hard, with a
smooth compact texture. When broken it has a smooth
shirty surface, is of various sizes from four to twelve
inches in diameter, and generally roundish with somewhat of slatness. It is covered with a deep yellow
crust, softer than the substance of the Stone, which
will crack when exposed for some time to the air.
This Stone is very hard, heavy, and will bear a tolerable polish.

The Hard Greyish Brown STONE, with brown partitions, is very close and compact, and has a very smooth surface when broken. It is met with from three to four feet in diameter, and the shape is always irregular. It is without a crust, and sometimes appears a little bright. The veins, which are few, are very broad; and, though it is remarkably hard, it will not strike fire with seel, but ferments violently with aqua fortis, and calcines to a greyish white. It is

common about Landon and elsewhere.

The Hard Ferruginous Brown STONE, with brown partitions, is very firm, strong, and of a compact regular texture, with a smooth even surface when broken. It is two or three seet in diameter, is generally broad and flat, and most commonly without a crust. It breaks into thin slakes in a very regular manner, with a great many shining specks. It is remarkably heavy, very hard, and will bear a pretty good polish. It will not strike fire with steel, but ferments greatly with aqua fortis, and burns to a brownish red. It is common on the shores in Torksbire.

The Soft Whitish STONE, with brownish yellow partitions, is of a very soft and loose consistence, and full of great numbers of empty cracks. It is seldom ove with inches in diameter, and is of a roundish

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shape. Sometimes it is invested with a crust a little paler than the inside of the Stone, and when broken a few shining specks may be seen. It ferments greatly with

aqua fortis, and calcines to a pure white.

The Elegant Crustated STONE, with a blueish nucleus or kernel, is of a very close even texture, and is generally about eight or ten inches in diameter, and of a roundish flattish shape. The crust is about the fixth of an inch thick, and of a pale yellowish brown, as well as the rest of the mass. The nucleus in the centre is usually about four or five inches broad, and about half an inch in diameter. It is of a pale blueish grey, and round it the substance is disposed in regular crusts, which grow thinner as they approach the centre. It ferments with aqua fortis, and burns to a pale red. It is not very common; but is found in Leicestersbire.

The Hard Dusky Brown STONE, with very thick partitions, has a fine close texture, and an even surface. Its shape has a tendency to roundness, and is generally between four and five inches in diameter, with a pale yellowish brown crust, though sometimes it has none at all. When broken the surface is irregular, and looks like slint; but it has few spangles. The partitions are numerous, broad and thick, of a pale brown colour, and pretty transparent. They are all irregular, and this Stone will bear a pretty good polish. It will not strike fire with steel, but ferments

most strongly with aqua fortis.

The Hard Greyish Brown STONE, with thick whitish partitions, is different from all the foregoing; for it is divided into angular squares of irregular shapes. The texture is firm and compact, and the surface irregular and rugged. The size is from four to eight inches, and it has a tendency to roundness. It seldom has a crust, and when broken does not at all sparkle. It may be generally observed, that in these sort of Stones the softer they are, the more they are spangled; but the harder, the less spar they contain. This stone is very heavy, and takes a good polish; but will not strike size with steel, though it ferments violently with aqua fortis.

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The Brown Compressed STONE, with yellow partitions, is generally of a very large fize, it being from one to three feet in diameter. It is of a broad and flat shape, and seldom above four inches thick. It is fometimes invested with a thin yellowish brown crust. but is most commonly found naked. It has a reddift cast, which is owing to a slight tinge of iron, though the prevailing colour is a pure brown. It has a smooth furface when broken, but has no shining specks. The partitions confift of fine glittering spar of the colour. of honey, which is disposed into columns, and is regularly and beautifully dispersed throughout the mass of the stone, dividing it into oblong angular pieces with three or four fides, and from one to two inches in diameter. It is very heavy, hard, and will bear a fine polish; but will not strike fire with steel, though it ferments violently with aqua fortis. It is common on the shores of Yorksbire, Suffex, and Kent.

The Whitish Grey and very Hard STONE, looking like slint, is of a sirmer texture than any of the former, with a pretty smooth even surface. It seldom exceeds six inches in diameter, and is always of a round or oval shape. It is mostly covered with a thickish brown crust, and on the inside it is sometimes very pale, and sometimes mixed with more or less brown. It appears like slint when broken, and has no shining specks. It has but few partitions, and those very thin, and of a very pale brownish white. It is remarkably heavy, and very hard, though it will not strike sire with steel; but ferments violently with aqua fortis, and burns to a pale greyish white. It is

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not very common.

Blueish STONE, brown on the outside, with white partitions, is pretty hard, with a rough irregular surface; and is of various sizes, from a few inches to two feet in diameter. It is always flattish, being seldom more than six inches thick in the middle, from whence it becomes thinner to the edges every way. It is sometimes invested with a pale brown crust of earthy matter, mixed with a little spar; but is most commonly entirely naked. Wherever this stone breaks with ease, it is always of a pale brown, but elsewhere

WATERS, EARTHS, FOSSIL'S and MINERALS. 200

of a dusky blue or lead colour, with a few shining spangles. The partitions are of a very pure white, shough sometimes a little tinged with the colour of brimstone. They are very numerous, and divide the mass into many pieces, which consist of several sides, and are from one to three inches in diameter. It is capable of a good polish, but will not strike fire with steel, though it ferments violently with aqua fortis, and burns to a pale dusky red. This stone is very uncommon.

Hard Pale Yellow STONE, with a few thin partitions, is of a pretty firm texture, but the furface is rough and unequal. It is fometimes three feet in breadth, and very flat, for it feldom exceeds two or three inches in thickness. The pale yellow is sometimes mixed with brown, and when broken its furface is pure and regular. It has a few shining spangles in different places, and is fometimes covered with a thin shell of a pale grey earthy matter. The partitions confift of a pale brown spar, disposed in short irregular columns, and generally lie in ftraight perpendicular directions, dividing the mass into large pieces and on each fide of the cracks filled with these partitions there is often a coat of white sparry earth; for which reason this stone may be easily divided into pieces. It is pretty heavy, and will bear a tolerable polish. It is common in the middle counties of England.

Soft Dusky Yellow STONE, with very thick partitions, has a pretty smooth texture, but not very compact: the surface is uneven, and the size is from two inches to two feet in diameter. It is always flattish, though generally thickest towards the centre, and thinner at the edges. When it has any crust, it is always a little softer than the rest of the stone; and the disagreeable dusky yellow is mixed with a little brown. When broken it appears in irregular slakes, with a rough surface, on which are a few spangles like talc. The partitions consist of a pale yellow spar regularly dispersed through the stone, and are pretty numerous, many of which are no less than one third of an inchin diameter. It is pretty heavy, though soft, and does,

does not ferment greatly with aqua fortis. It may be

feen in the clay pits near Deptford.

The Hard Bright Yellow STONE, variegated with brown, is of a pretty fine close texture, with a very rugged unequal surface; and the fize is from four to twelve inches in diameter. It is always oblong and flat, being no thicker in the middle than elsewhere. It has commonly a thick crust of the same substance with the stone, but softer; and is of a very bright beautiful yellow, with sometimes a brown coat, and at other times veined in different directions. When broken, the surface is tolerably even, and there are shining speeks of spar in different places. The partitions are thin, but consist of a pale brown spar. It is moderately hard, and will take a slight polish. It is common in the tile clay-pits about Pancras.

The Very Hard, Brownish, Yellow, Undulated STONE, with a very few whitish partitions, is of a very even compact texture, with a smooth regular furface. It is from three to nine inches broad, of a statish shape, and oftener square than oblong. When broken it has a tolerably smooth surface, with long specks of spar. The partitions are very few and small, and it is often without any. It is very heavy, extremely hard, and will bear a sine polish; but yet it will not strike fire with steel. It is common on Mendip

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The Hard, Greyish, Yellow STONE, is divided into pieces by thin yellow partitions, and has a very fine close texture, but the surface is irregular and unequal. It has been found from four to twelve inches broad, of a roundish slat shape, and seldom with any crust. It appears smooth when broken, with a few glittering spangles. The partitions are of a fine pale honey colour, and are very numerous, running among each other in all directions, and forming a fort of network, somewhat like a honey-comb, but of various shapes. The pieces contained in these are about an inch in diameter, having from three to fix sides, and the partitions consist of a transparent spar. The whole is very heavy, considerably hard, and will bear a

WATERS, EARTHS, FOSSILS and MINERALS. 209

good poliff; but it will not firike fire with feel. It is

frequently met with on the fea shore.

The Round Yellow Ferruginous STONE, with thin straw-coloured partitions, has a smooth even texture, is about eight or ten inches in diameter, and in the shape of a round ball. It is always crusted with a paler colour, which is softer than the substance of the Stone, and near an inch thick. The colour is a mixture of rusty iron, and a pale yellow; and when broken the surface is smooth and even, with a few shining spar specks that look like talc. The partitions are of a beautiful colour, and are composed of most bright pure spar, without any order. They are always thickest at the centre, and very sew reach to the surface. It is considerably heavy, pretty hard, and will bear a slight polish. They may be seen in the clay pits between London and Islington.

The Roundish STONE, of a rusty red colour, with yellowish partitions, is pretty like the former, and is between fix and twelve inches in diameter. It is always covered with a thick crust, of a whitish brown clayey earth, containing a good deal of spar, and is commonly about half an inch thick. When broken the surface is even, and has a few shining specks. The partitions are principally about the centre, and are of a fine bright yellow. It is very heavy, pretty hard, and will bear a tolerable polish.

It may be feen in the clay pits near Iflington.

The Rufty Brown STONE, with whitish partitions, has a pretty smooth texture, but not very firm; the size is from two to twenty inches, and always broad and flat. It is generally covered with a thick whitish brown crust, and the surface when broken has many shining sparry specks. The partitions are pretty regular, running through the stone in perpendicular directions. It is so soft as hardly to bear any polish, and is common on the shores of Yorkshire.

The Hard Blackish Brown STONE, with a yellow coat, has an exceeding fine texture, with a pretty even surface; and is from four to six inches in diameter, and always of an oval figure. The crust is of an ochreous clay, different from the rest of the mass, and

The NATURAL HISTORY of

is very brittle. It is commonly composed of thin coats laid evenly one upon another, and adhering but flightly. They are of a fine deep yellow, and are easily broken from the stone by a small blow. The body of the stone is a mixture of rusty colour and black, and when broken has a smooth flinty surface. The partitions are of a very pale yellow, and are pretty thick, dividing the stone into irregular pieces. This Stone is very common in many parts of the

The Hard Brown STONE, with fnow-white earthy partitions, has a very close texture, with a pretty fmooth and even furface. It is commonly of a roundish or oval shape, and from three to twelve inches in diameter. It is sometimes naked, but oftener met with in firata, covered with a thin brown earthy cruft. The colour is of a pale brown, and when broken the furface is pretty fmooth, with shining specks of fpar thereon. The partitions are fost and crumbly, and confift of a white marl. It is very heavy, confiderably hard, and will bear a very good polifh; but will not firike fire with steel. It is not very common, though it has been found in the counties of Somer fet and Huntingdon.

The Hard, Rufty, Brown STONE, with yellow earthy partitions, is of a very firm compact texture, with a rough furface, and is generally flattish, and from four to ten inches broad. It has feldom any coat, but when it has, it is of a pale yellowish fost substance. The brownish rust colour is commonly spotted and clouded with black, which sometimes appears in the shape of shrubs, trees, and mosses, like those of the Mocha Stone. When broken the surface is fmooth, and there are usually no sparry specks. The partitions are narrow, few and irregular; these confift of ochre and marl, of which the first is in the largest quantity. It is considerably heavy, hard, and will take a good polish, but will not strike fire with fleel. It has been found in Leicestersbire, Northamp: tonsbire, and near Highgate.

The Hard, Pale, Brown STONE, with partitions of a clayey earth, is of a close firm texture, with a rugged.

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WATERS, EARTHS, Possils and Minerals. 209

rugged furface, and commonly of a roundish or oval shape, and from four to twelve inches in diameter. It is often covered with a thin crust of a pale brown colour, though it is sometimes without it. When the substance of this Stone is broken, it appears with a coarse surface of the same colour; but if according to the partitions, it is of the colour of rusty iron. The partitions are of a clayey earth, tinged with iron particles; and they are irregular and sew in number: besides these there are exceeding sine cracks, in which places the Stone naturally breaks. It is very heavy, considerably large, and will bear a pretty good polish,

but will not firike fire with feel.

The Soft, Pale, Brown STONE, with partitions confifting of the same substance as the pyrites, is of a pretty coarse and loose texture, and somewhat porous, with a very fmooth furface. Its shape is very uncertain, though most commonly roundish, or oval, and feldom exceeds fix inches in diameter. When it is broad and flat it is most commonly naked; but when roundish, it has a thick whitish crust. The surface is irregular when broken, and has a tafte of vitriol, which none of the others have: the partitions are pretty numerous and irregular, but never thick, and confit of a double plate of the vitriolic pyrites. This stone may be readily divided at these partitions, as well as the plates from each other, after it has lain fome time in the air; for before that it will break more eafily any where else. The substance is soft and brittle, and consequently will not bear a polish.

The Rusty Red STONE, with yellowish brown partitions, has a very fine compact texture, with a very smooth glossy surface. It is of various shapes, sometimes oblong or oval, but more generally pretty much flatted, and is from three to twelve inches in diameter, and from four to six thick. Its colour is of a dusky brownish red, not always perfectly mixed; for in some places they are almost distinct, and form a sort of clouds or spots. When broken it appears to have an even glossy surface, without shining specks. The partitions are many and pretty thick, with a streaked texture, composed of an arrangement of

brownish

210 The NATURAL HISTORY of

brownish yellow columnar spar, which is pretty hard, though not very bright. The pieces divided by these partitions are of different shapes and fizes, and from half an inch to sour inches in diameter. This stone is very heavy, extremely hard, and will bear an exceeding sine polish. It will strike fire with steel, but with great difficulty, and ferments briskly with aquatorities. It is very common in Yorkshire, and in most

of the northern counties of England.

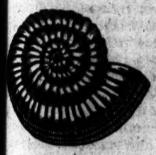
The Brownish Yellow STONE, with whitish partitions, is of a very firm texture, with generally a perfectly smooth surface. It is of various shapes and fizes, and is fometimes found in continued firata, though more commonly in irregular shapes; but always compressed and flatted, from three to fourteen inches in diameter, and about five inches thick. It is met with on the sea coast, particularly near Scarberough in Yorkshire. They have feldom any crust, but when they have it is of a rufty colour, and about a third of an inch thick. The colour of the Stone is of a very fine ferruginous yellow, and when broken the furface is smooth and glossy, looking almost like flint. The partitions are numerous, and in many places thick and broad; they confift of a semi-transparent fpar, which is very hard, and by these the Stone is divided into a multitude of irregular pieces, from one to four inches in diameter. It is very heavy and hard, and will firike fire with feel, but with great difficulty.

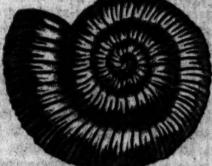
The Blueish White STONE, with straw-coloured partitions, has the same texture as the two former, with a rough rugged surface. It is generally found in loose marshes, of a flattish shape, with some tendency to round or oval; but generally with rough edges, and from four to eighteen inches in breadth, and from two to six thick. It has seldom or never any coat, and the colour consists of a mixture of blue and white. When broken the surface is glossy, and without any shining specks. The partitions are of a streaked texture, and are composed of a fine transparent bright spar, with irregular columns. It is considerably heavy, pretty hard, and will bear a good polish. It strikes

Ammon's Hornes 296









Horse Head Stone



Bucardites 299



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WATERS, EARTHS, FOSSILS, and MINERALS. 211

fire with fleel with great difficulty, and ferments brifkly

with aqua fortis. It is common in Yorkshire.

The Pale Yellow STONE, with a rufty coloured nucleus, is of a pretty close compact texture, and of a roundish shape. It is about four inches in diameter, and is covered with a thin pale cruft, within which there are from three to five coats of a different thickness, but all of the same substance, and much of the fame colour, that is, of an agreeable pale yellow. When broken, the surface is pretty smooth, with many fining specks of spar. These coats have a nucleus or kernel in the center, confifting of a hard ferruginous stone, and are divided from it by a thin regular partition of a straw-coloured spar, from which there run a great many other straight partitions directly to the circumference, but growing narrower as they come near it. It is pretty heavy, but not very hard, for it will not strike fire with steel. The nucleus is of a different substance from the rest, is very heavy, and of a firm texture; it strikes fire with steel, but will not ferment with aqua fortis. It confifts of a large quantity of ferruginous matter, with a deep brown clay. It is to be met with on Mendip Hills in Somersetsbire, and in a clay-pit near Islington.

The Brownish STONE, with a blackish brown nucleus, is of a pretty fine close texture, with a smooth regular furface, and is always roundish, though generally a little flatted. The fize is two or three inches in diameter without any crust, and there is a hard blackish brown nucleus in the center, of a close texture, contained in a thin crust of a paler colour, but of the same substance. It is about half an inch in diameter, and the crust about an eighth of an inch thick. The Stone is composed of two other coats nearly of the same thickness, and of different degrees of brown. They are divided from the nucleus by a fine thin partition of whitish spar, from which others run that are straight towards the circumference, and yet but feldom pass through the inner coat. The nucleus is hard and stony, but not so much as the former, for it breaks pretty eafily, and is full of small specks of loose spar. It consists of earthy and ferruginous

matter,

matter, and will strike fire with steel, though with great disticulty, and will ferment a little with aqua fortis. It is to be met with in Northamptonshire, Leicestershire and Yorkshire, and has been sometimes sound

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near London.

The Hard Whitish Grey STONE, with a brown nucleus, is of a very fine close texture with a smooth surface, and is always roundish or oval. It is generally about two inches in diameter, and is covered with a pale whitish yellow crust. The nucleus is brown and covered with a crust as hard as itself, but somewhat of a paler colour, and on its outside there is a fine sparry partition, which is firm and hard; from this there generally runs three or four narrow partitions towards the surface, which seldom reach the outer crust. It is very hard, and capable of a good polish, but will not strike fire with steel, nor yet the nucleus. It is a very uncommon Stone, and hard to be met with.

The Small Ferruginous STONE, of a roundish or oblong shape, is generally known by the name of Mineral Bezoar, because it has coats like Animal Bezoar. It has a close firm compact texture, with a smooth furface, and is always either of a round or oblong form, generally about three quarters of an inch in diameter, and from half an inch to two inches in length. They are constantly covered with a crust of a pale whitish substance of about a fixth of an inch thick. They always confift of a large central nucleus, fometimes furrounded with two or three coats of fersuginous matter, and fometimes irregularly blended with it, making together a fingle nucleus furrounded with a crust. Both the nucleus and the crust are generally divided into three, four or five parts, by pretty large cracks, which are widest on the outside, and usually become narrower as they approach the center. They are commonly empty towards the surface, but near the center they are filled up with a fine transparent spar. The Stone itself is pretty hard, and will bear a pretty good polish. It will hardly strike fire with steel, and ferments but very little with aqua forWATERS, EARTHS, FOSSILS, and MINERALS. 213

tis. It is common in the brick and tile clay-pits in

all parts of England.

The Oblong, Pale, Brown STONE, with a long hollow nucleus, is of a very close firm texture, with a rugged unequal furface. The shape is oblong and cylindric, only it is largest in the middle, and becomes gradually lefs towards each end; but for half an inch they each terminate in a small cylinder of almost a whitish colour, and of a harder substance than the other parts. This is nothing but a lengthening of the inward substance, being only the extremity of the nucleus. It is between feven and eight inches long, and yet the diameter is three inches where thickest. The nucleus consists of a long cylindric tube, terminating in a blunt point at each end, which is fometimes empty, and fometimes filled with a white marl, or the matter of the stone that contains it. It is of a ferruginous colour, and is inclosed in a thin crust of a brownish substance, which is surrounded with a fingle, double, or triple partition of beautiful spar, and this again with two thick crusts confisting of the same substance as the rest of these stones. It is divided by three or four partitions, running like rays from the circular partition straight towards the circumference, but they generally vanish in the first or second coat. The whole is furrounded with an unequal whitish brown coat about a third of an inch thick. The cavity of the nucleus is half an inch in diameter, and the nucleus itself about an inch. This Stone is subject to a great number of cracks lying in different directions, fo that when firuck it will fall into many pieces, not more than the tenth of an inch in thickness each. The nucleus is very heavy and hard, but will not strike fire with steel, any more than the body of the Stone. The partitions confift of a pure white spar, which appear very bright when just broken. It has been found hitherto only in a great tile clay-pit near Oxford road, about three quarters of a mile beyoud Tyburn will be went Man in treat the cases

The Very Hard Smooth STONE, with yellow brown and red coats, has a very fine compact texture, with a pretty smooth surface, and is remarkably heavy.

Its shape is roundish or oblong, and the fize is from a quarter of an inch to three or four inches in length; but most commonly of the shape and fize of a pigeon's egg. It is fometimes found naked with a fomewhat gloffy furface, and at other-times covered with a whitish crust. It consists of five or fix coats, which in close a firm folid hard nucleus of the same substance. that is fometimes of a deep duky brown, and fometimes of a strong though not bright red; at other times it is composed of both these colours, either blended or in spots. The coats are alternately brownish. yellowish and reddish, that next the nucleus being brown, the next yellow, and the third reddish, with another that is yellow, and over these one that is brown. However, they fometimes vary in the disposition. It is very common in clay and gravel-pits, and particularly about London, when covered with a crust. One

fourth part of this Stone is iron.

The Hard, Glittering, Rough STONE, with brown purple and deep yellow coats, is of a coarse, uneven, and very irregular texture. The shape is always oblong, but of different lengths and thicknesses; it is from half an inch to eight inches long, and about three quarters of an inch in diameter. It has a rough furface made up of small prominences and cavities, less than the heads of the smallest pins; but this is uncommon, for it is usually stuck full of small pebbles. It is pretty hard, and breaks with a rough furface, and there is a nucleus' furrounded with eight or ten coats, some of a paler, some of a deeper brown; others of a dusky and somewhat reddish colour, and others again of a deep brownish purple; but they are placed without any order or regularity. It is pretty bright and sparkling, not only when just broken, but on the furface; and the whole substance of the coats is full of fmall shining spangles like talc. It is common in the gravel-pits about Oxford, as well as in other places, and contains a small quantity of iron.

The Soft, Brownish, Yellow STONE, is almost as fost as earth, but is very compact, of a smooth texture, and considerably heavy. It is of a flattish oblong shape, and round at the ends; and is most

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WATERS, BARTHS, FOSSILS, and MINERALS. 215.

commonly four inches long, two broad, and one thick. It is oily to the touch, and breaks with an irregular but smooth surface. It contains a nucleus of the same shape as the stone, and of the same colour, surrounded with coats of the same, which are extremely thin and exceeding numerous. It has no crusty covering, nor does it at all sparkle. It ferments very briskly with aqua fortis, and burns to a beautiful pale red. It is very uncommon, but has been seen in the potters clay-

pits in Staffordsbire, and in the forest of Dean.

The Soft STONE, with thining brown and dufky green coats, confifts of a coarse opaque substance, and is of a loose texture. It is remarkaby heavy, of an oblong shape, and commonly about an inch and a half in length, somewhat in the form of a ninepin. It is harsh and rough to the touch, the furface being extremely uneven, and when broken it has an irregular and pretty rough furface. It is generally composed of four coats, furrounding a nucleus of the fame fubstance and shape as the stone. This is surrounded by a brown broad coat, and that by another that is broader. The next is a very beautiful one, it making a fine glittering appearance, and is of a very pale brown colour; over all there is a coat of dufky brown clay, which is always rugged and unequal. It is very common in clay-pits in many parts of the kingdom, and particularly in a clay-pit near London behind Black-Mary's-Hole.

The Soft STONE, with shining whitish yellowish and red coats, is of a loose brittle texture, and moderately heavy. It is commonly oblong, rounded at the ends, and of the fize of a pigeon's egg. It is very rough, and will readily break with a small blow; it has from four to fix coats of the same loose texture, but of different colours; but there is always one that sparkles, and is composed of the matter of the common selenites. The nucleus is commonly whitish, though sometimes with a mixture of yellow, and is of the same shape with the stone. The coat which immediately surrounds the nucleus is generally yellow, the next red, and the next whitish; then one that is yellow, and over these is the outermost, which is com-

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216 The NATURAL HISTORY of

posed of great numbers of small columnar selenites, that together appear almost like crystal. It is very common in the clay-pits of Northamptonshire, and may be met with in several other counties.

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CHAP. XXVIII.

Of the barder Common STONES.

HE Hard, Shining, Black and White STONE. is of a very irregular structure, but extremely firm, with a smooth though not glossy surface. It is from eighteen to twenty-five inches in diameter; but of different shapes, which all tend to be round, oval, or flat. At first fight it appears to be only of a dull yellowish white, and a glossy black. The white specks are fometimes flightly tinged with a flesh colour, others are of a cream colour, and others again shine like pure crystal. The furface is of a dull dead colour, but it is very bright and sparkling when just broken. It is confiderably heavy, very hard, and will take an excellent polish. It strikes fire with steel, but will not ferment with agua fortis. It is common on the shores of the island of Guernsey, and is met with in many places on the English coast. It is used in paying the fireets of London. See all city to a the

The Hard, Shining, Red and White STONE, is of much the same texture as the former, but of a better colour, and the shape tends to roundness or an oval. It is found often of twenty or thirty inches in diameter, with a very smooth surface; and the colour is a pleasant light red, and sometimes a sless-colour, interspersed with small parcels of a pure bright white, from one eighth to one fourth of an inch in diameter. When broken it is smooth, bright, and beautiful; and is so hard that it will bear a very sine polish, as well as strike fire with steel. It is brought from the shores of Scotland, and is used in London for paving the streets.

The Red STONE variegated with white and black is of the same texture with the two former, and has a smooth, bright, glossy surface. Some are eight inches

in diameter, and the shape is generally oblong and flattish. The colours are all beautiful and bright, the ground being red, variegated with all the different degrees and forms of a white transparent and black cry falline tale, which are fo various in different flones. that they do not feem to be of the fame kind. It is confiderably heavy and hard, will take a fine polific. and strike fire with steel. They are found on the hores of Guernsey island, and brought to London to pave the streets, where they may be easily distinguished

by their furfaces after a shower of rain.

The Hard, Heavy, Greyish Black STONE, variegated with white, is of a more rude, irregular, and harsh texture than any of the former, though it is more compact and hard. The surface is smooth and even, but not gloffy, and is generally about ten or twelve inches in diameter; but the shape is uncertain, though it is commonly flat on one fide. It is not so beautiful as the former, being of a greyish or blueish black, with opake but very bright white, distinct from each other, yet regularly intermixed throughout the whole stone, so that it seems to consist of a regular mixture of black and white. When fresh broken the furfaces are remarkably smooth and bright. and it will bear a high polish. It strikes fire with steel. but will not ferment with aqua fortis, nor fuffer any reat alteration by fire. It is found on many parts of the shores of Yorkshire, and is sometimes seen in the freets of London.

The Brownish Red STONE, variegated with white and yellow, is of a pretty even fine texture, fomemes from three to four feet in diameter, and of a omewhat oblong and flattish shape. The ground is f a reddish brown colour, which is variegated with n impure talcky crystalline matter, generally about n inch long and half an inch in diameter, that is ther of a pure or yellowish white; and these variegaions are often four or five inches diftant from each ther. It is pretty hard, will take a good polifh, and rike fire with steel, but does not ferment with aqua ortis. It is found on the furface of the earth in York-

ire and other counties.

218 The NATURAL HISTORY of

The Reddish White STONE, variegated with black and gold colour, is of a more loose texture than any of the former, and very coarse. It is generally found between four and eight inches in diameter, and is of a very irregular shape, being seldom round, oval, or stat. The colour is either a pale sless, a deeper red, or entirely white. The particles of which this stone is composed seem to be a crystal debased with earth, and more or less of a metalline tinge, of the size of a horse-bean. Among these, black and yellow variegations are dispersed, which are composed of crystal, earth, and tale, of different degrees of brightness. It is considerably hard, very heavy, and capable of taking a fine polish. It is common on the shores of York-shire.

The Hard White STONE, variegated with brown, is of a very coarse harsh texture, but extremely firm and hard, with a smooth glossy surface. The size is from two to ten inches in diameter, and it is generally of a roundish or oval shape. The ground is of a dusky white, variegated with pale brown; but they are distinct from each other, and interspersed with a great many stakes, some of which consist of a pure crystal line with talc. When sresh broken, it glitters very much, especially in the white parts; it strikes fire with steel, but will not ferment with aqua fortis. It

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is common in Westmoreland and Yorksbire.

The Blueish, White, Bright, Brittle STONE, contains more tale and less crystal than the former; for which reason it is of a flaky texture, though very irregular, and the surface is rough and uneven. It is from ten to sourteen inches in diameter, and of a very uncertain shape, being generally rough and jagged at the ends and edges: Its colour consists of a dark blueish grey, and a pretty pure opaque white; the former of which is the ground, though sometimes it happen otherwise. It is composed of different masses, as in the other kinds; and those that are stony or crystalling are much of a size, and seldom larger than a horse bean. It is but light in comparison of the rest, and is very brittle. It does not at all seem proper for polishing, though its stony parts will strike size with steel

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WATERS, BARTHS, ROSSILS and MINERALS. 219

but it will not ferment with aqua fortis, and when burnt it is whitish with a silvery gloss. It is common in Torkspire and the neighbouring counties, where the common people make use of it in the winter nights to keep the bed warm, or rather their feet, to which it is laid after it has been heated; for it will retain the heat a considerable time; and they give it the name of

the Warming-Stone.

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The Brown Brittle STONE, variegated with yellow. is very beautiful, with a pretty fine even texture, but more loofe than the former, and with a rough furface occasioned by prominences and cavities. It is of various fizes, but feldom exceeds fix inches in diameter; and the shape is quite irregular, though it is fometimes flat, and tending to an oval. The diffinet parts of which it confifts are feldom above one twelfth of an inch in length; and they are all of the fame colour in the fame mass, which is of a pale brown; among these are a great number of talcky flakes that are extremely bright, which are sometimes intermixed with spangles of black and whitish tale; but they are to uncommon, that brown and yellow may be faid to be the true colours of the stone. When broken it appears extremely beautiful; but it is so soft as not to be capable of a good polish, and therefore will not readily frike fire with feel. It is found in many parts of Suffex and Yorksbire, and has been feen on Hampstead Heath.

The Hard, Purplish, Brown STONE, variegated with white and yellow, has a very rough, coarse, uneven texture; but it is sirm and hard, with a rough unequal surface. It is commonly found from ten to eighteen inches in diameter, and the shape always approaches to round or oval, with a smoothness and flatters on one side. The colours are generally brown and white, or brown and yellow. The brownish purple parts make the ground, and consist of considerably arge pieces, that are perfectly opaque. Those that are white and yellow are smaller, more bright, and in some degree transparent, they being composed of a mixture of crystal and talc. It is a little bright when tesh broken, and is very hard; for it will readily strike

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fire with steel. It is common on the shore near Scarborough, and has been sometimes seen in the streets of London.

The Hard Blueish Green STONE, variegated with white, is the most beautiful of the whole class. It is of a pretty firm, fine, but unequal texture; and in many places is loofe, irregular, and porous. The furface is very smooth; the usual fize is from three to four inches; and it is of a round or oval shape, but always flatted on one fide. The greenish particles, of which the Stone chiefly confifts, are all of a cryfalline substance debased with earth, and tinged with metalline particles. Its variegations are finall masses of white, confifting of crystal and tale, and debased with very little earth. It is very beautiful when broken, and is extremely heavy and hard; but it will not admit of a perfect polish, because its texture is a little porous: however, it readily strikes fire with steel. It is found on the shores of Suffex, but is most common in Wales, and contains a pretty deal of copper.

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CHAP. XXIX.

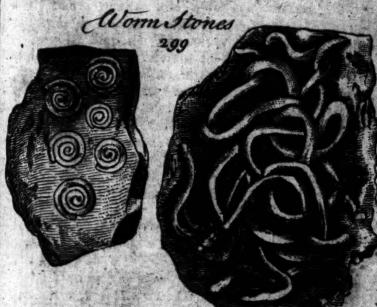
Of STONES approaching to the Nature of FLINT

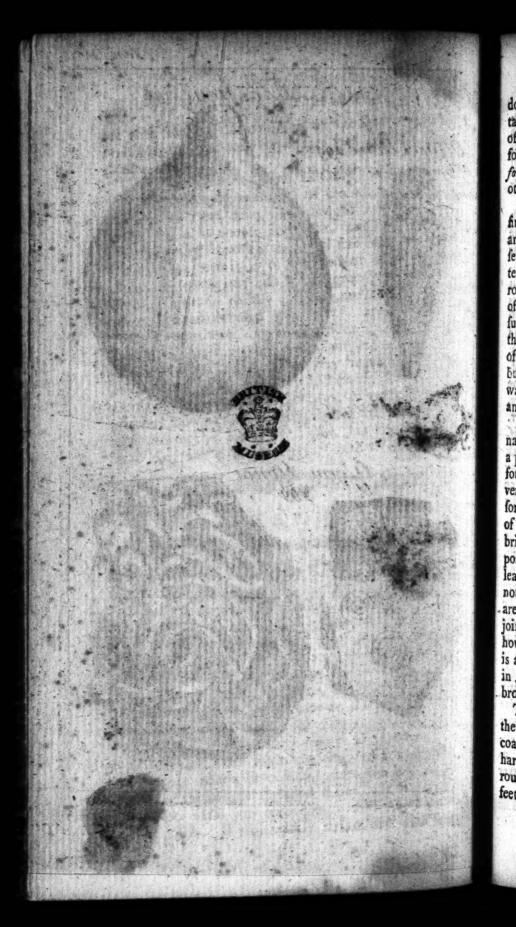
THE Yellowish White STONE, filled with ped bles, commonly called the Pupping-Stoni is of various shapes, according to the various pebble it contains. It has been by fome ranked among per bles, but improperly; for they are no part of the Stone itself, which is a distinct species, and differe from all others. The fementitious substance is opaque Stone, of a very fine, close, and firm textur with a pretty fmooth furface on the infide, though the masses it is frequently very rugged and unequa In fize it is from that of a walnut to three or four to in diameter, with some tendency to roundness. It of a pale yellowish colour, and when broken the su face is smooth, even, and flinty. It is pretty hea and very hard, and confequently will take a very bea tiful polish. It will readily strike fire with steel,

Pear Stone 298

Olive Stone 299;







does not ferment with aqua fortis. The pebbles contained in it are of various kinds and fizes, from that of a pin's head to the bigness of a walnut. It is found in many parts of England, particularly in Hertfordspire, and is used for the tops of snuff-boxes and

other toys.

The Greyish White STONE, filled with pebbles, is since and harder than the former, but is very opaque, and has an exceeding smooth glossy surface, for it resembles a smooth spotted pebble. It seldom exceeds ten inches in diameter, and its shape is almost always roundish all over. The pale greyish white colour often contains more of blue than pure white, and the surface is very smooth when broken. When cut into thin pieces it is somewhat transparent, and is capable of a beautiful polish. It readily strikes fire with steel, but will not ferment with aqua fortis. It is almost always found in gravel-pits among shints and pebbles, and is used for shuff-boxes like the former.

The Red STONE, filled with pebbles, is of the same nature with the two former, and is very opaque, with a pretty coarse texture and a rugged surface. It is found from fix inches to four feet in diameter, and of very irregular shapes. The colour is a deep red, and sometimes there are different shades in different parts of the same piece. When broken, it is scarce at all bright or glossy, and its sineness is generally in proportion to its colour, for it is greatest where that is least. It will readily strike fire with steel, but will not ferment with aqua fortis. The peobles it contains are of various sizes and kinds, and not so perfectly joined to the mass as in the other species; they are, however, not easily separated from it, and therefore it is as sit for use as any of the former. It is common

brought up to London.

The Brownish STONE, filled with pebbles, is of the same kind as the former, but is more impure and coarse. It is perfectly dull and opaque, with a rough harsh texture, but yet pretty firm; and the surface is rough, rugged, and unequal. It is from two to sive seet in diameter, and is of a very irregular shape,

in Lincolnsbire, Derbysbire, and Yorksbire, but is seldom

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though it sometimes shews a tendency to roundness. The colour is always of a dusky brown, but in various degrees. It is not so heavy as the former, though it trikes fire with steel. It contains very small, as well as some large pebbles, which are generally a little stat-

tish. It is common in Leicestersbire.

The Flesh-coloured STONE, filled with reddish impure crystalline nodules, is of a coarfe, harsh, loose texture, and somewhat porous, with a rough irregular furface. It is found from four to twelve inches in diameter, and the shape is almost always flattish. It is generally fo full of the masses it contains, that it is hard to find a speck of the pure cement of the bigness of a pea. Its colour is a very pale whitish red, and the forface when broken is uneven without any glos. It strikes fire with steel, though not without some difaculty; but does not ferment with aqua fortis. The hodules are all of the same kind, but of various fizes, from the bigness of a pin's head to an inch in diameter. There is a great number of them, and they lie in different directions. Those that are large are easily struck out of the cement, leaving a pretty fmooth cavity behind. These nodules consist of a fort of crystalline particles. This Stone is common in the fides of hills in Yorksbire.

The Blueish Glittering STONE, filled with white impure crystalline nodules, is of a pretty coarse, harsh, uneven, and irregular texture, with a rough surface; and is of various sizes, from one foot to four or sive in diameter, and generally of a flattish shape. The colour is a deep dusky blue or lead colour, and there are many bright glittering spangles. The surface is roughish when broken, and it seems to be a-kin to some of the lime-stones. It is very heavy, moderately hard, and capable of a very good polish. It readily strikes fire with steel, and ferments a little with aqua fortis. The crystalline masses are the same as those in the former Stones, only they are without any colour. It is found in many parts of Leicestersbire, as well as on the shore near Scarborough; but is never

put to any use.

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WATERS, EARTHS, FOSSILS, and MINERALS. 223.

The Whitish Green Beautiful STONE, filled with crystalline nodules, has a pretty fine, close, firm and hard texture, with a rugged unequal furface, without the least gloss or brightness; and the crystalline nodules generally stand pretty far out of their cement. Its fize is from two inches to two feet in diameter, and its shape is generally flattish, seldom inclining either to round or oval. The colour is a pale whitish grey, irregularly tinged with a very beautiful green; though it is not diffused through the whole Stone, but appears in the form of specks and clouds. It has a rough and wrinkled surface when broken, without the least transparency; and in breaking of it the nodules get out of their places, leaving cavities behind. They are generally smooth, but not glossy; and they seldom exceed the fize of a small pea. They are outwardly of a very deep green, but within are white and opaque. They confift of a tabulated spar, and the green colour is owing to the mass in which they are included. This Stone is moderately heavy and pretty hard; but it will not take a good polish, nor yet strike fire with steel without difficulty. It is found on the shores of Minorca, and now and then on the English coast.

The Brittle, Pale, Red STONE, variegated with white veins, and containing red nodules, is the foftest and most brittle of this class, with a coarse loose texture, and a rough irregular surface. It is of various sizes, for it has been found from one to thirty inches, and is always flattish. The red colour is different in different masses, it being sometimes of a brick colour, while other parts are of a pale sless. When broken, it is in many places perfectly spungy, without the least brightness, except in the white veins, which are not many. The red nodules are from the size of a pin's head to that of a hazle nut, and consist of the same substance as the Stone itself. The Stone is not proof against water, and will scarce give fire with steel.

It is common in the shores about Scarborough.

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224 The NATURAL HISTORY of

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Of Flinty S T O N E S.

HE Common FLINT is a stone universally known, and of a very fine compact texture. with a furface that is generally rough and rugged, with various protuberances. The fize is different. from an inch to two or three feet in diameter. shape is extremely irregular, it being in gravel-pits of the form of a common pebble; but in chalk, where it is found in greater plenty, it is met with in all shapes. It is always covered with a white crust, which is fometimes very thin, and fometimes one fixth of an inch thick. It confifts of crystal, debased with a large mixture of white earth, of the clay kind. The fubstance of this stone is uniform and equal, and is generally blackish, though sometimes grey. When broken it is of a fine even glossy surface, is semi-transparent, and will bear a fine polish. It is met with in all countries, and is put to various uses.

The White Flinty STONE is pretty fine, with a smooth compact texture, and a smooth surface, only it is furrowed with shallow wrinkles. It is generally roundish, but sometimes oblong, and its fize is from half an inch to eighteen inches in diameter. The colour is uniform throughout, which is always white, with a finall blueish cast. It is not equally pure, nor of the same degree of transparency; for some resemble the white cornelian, and others the common ground of agate. The coat is sometimes a little reddish, but is more commonly grey, or of a greyish brown. When broken it appears to have a fine even flinty furface; and, as it is very hard, it will bear a good polish. It will readily strike fire with steel, but will not ferment with aqua fortis. This is a common Stone in

many parts of England. The Red Flinty STONE is of a very fine firm texture, with a furface not fo even as the former; for it has deeper wrinkles, and often many prominences and cavities in different parts. It is generally roundiff, and from an inch to three inches in diameter. It is

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WATERS, EARTHS, FOSSILS, and MINERALS. 229

naturally uniform, being without spots, clouds, or streaks, and its colour is very fine, but it is of different degrees of red in different Stones, as well as of different degrees of parity. It has sometimes small, whitish, opaque spots, and some are brighter and more transparent than others. It often nearly resembles the different cornelians, and has generally a whitish coat, with a small mixture of ash-colour, or yellowish brown. When broken, it appears to have a slinty surface, is very hard, and capable of a good polish. It strikes fire readily with steel, but will not ferment with aqua fortis. It is very common in our gravel-pits, and many of the seals sold for cornelian are made therewith.

The Yellow Flinty STONE is of a very fine even texture, and is extremely firm; but the furface is rough and irregular, it being full of wrinkles and other inequalities, and the shape is generally rugged and unequal. The fize is from one inch to feven in diameter. and it confifts of crystal, debased with a yellow earth, to which it owes its colour. They are sometimes of a deep yellow, and fometimes inclining to a whitish grey. It resembles the yellow cornelian, and is often equal to the finest Stones of that kind; but is sometimes subject to imperceptible flaws, which will make it fly to pieces when broken. However, the furfaces are fine and gloffy, and it is more transparent than the former: as it is very hard, it will take a fine polish. It readily strikes fire with steel, but will not ferment with aqua fortis. It is not very common, but has been found on Hampstead Heath.

The Blueish Flinty STONE is of a pretty smooth and close texture, with a rough irregular wrinkled surface and a very uncertain shape. It is generally about two inches in diameter, and is not of so simple a colour as the former; for it is of different degrees of blue in the different parts, some of which are deep, and others approaching to white, appearing in clouds, spots, and short lines. It is without cavities or cracks, and its outer coat is of various colours, but generally with a white and chalk-like appearance; sometimes it is of a blueish brown, and sometimes very thick and

L 5 yellow.

226 The NATURAL HISTORY of

yellow. It is pretty hard, will take a good polish, and freely strike fire with seel. It is very common in

gravel-pits.

The Greenish Flinty STONE is not so close and compact as the former, nor yet so fine, though the surface is pretty smooth and even. It is generally of a roundish or oblong shape, and from half an inch to two inches in diameter. It is always of the same colour, without either spot or cloud, which is of a deep dusky and somewhat blueish green. It is sometimes of the colour of green jasper, but has a coarse look, as it contains a great deal of earth. The coat is generally thick and white, and sometimes of a blueish dusky grey. When broken the surface is even, and as it is very hard, it will bear a good polish. It readily strikes sire with steel, but will not ferment with aqua fortis. It is not very common, and consequently is but seldom found.



CHAP. XXXI.

Of STONES that outwardly appear like PEBBLES.

HE Stone called PEBBLE CRYSTAL has a very fmooth equal texture, it being in reality nothing elfe but Crystal in this form. It is free from all mixtures, and is found from the fize of a pin's head. to twelve inches in diameter. It is generally pretty. round, though fometimes not without irregularities. on the surface, and is sometimes. flattish. It has a close firm texture, is pretty heavy, and as transparent as water. It is very hard, is capable of a very high polish, and when broken is very bright and glittering. It strikes fire with steel, but does not ferment with aqua fortis. They are found almost in all parts of the world; but are most common in America, where they are very large, and are generally known here by the name of Brafil Pebbles. They are found. in that country on the banks of rivers, as well as in Germany, Italy, and France. They are also met with

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WATERS, BARTHS, FOSSILS and MINERALS. 227

in England; but their fize is very small. Spectacles are made with this stone.

The Purple, Half-transparent, Crystalline STONE, has a rough uneven texture, but is very firm, with a smooth surface; it is generally between an inch and sour inches in diameter, and of a roundish shape, a little statted. It is of an unpleasant yellowish white on the outside, but is pretty heavy, and when broken the colour is a reddish purple, very bright and glittering. The colour is not uniform, but appears sometimes in blotches, and sometimes in veins, in such large quantities, that they seem to tinge the whole mass. It is not quite so hard as the former, but will strike fire with steel. This is sound in rivers and gravel-pits, and has been brought from Germany and Bohemia. It is said also to have been met with in gravel-pits near London.

The Snow-white, Opaque, Crystalline STONE, is of a very smooth, firm, and close texture, with a smooth even surface: its fize is generally between a quarter of an inch and two inches, and though it is sometimes round, it is more frequently oval and flatish. It is as white as chalk on the outside, is pretty heavy, and when broken the colour is bright and shining, and as white as snow. It consists of a homogene substance, and is extremely hard. It freely, strikes fire with steel, but will not ferment with aqual fortis. It will take a very fine polish, and is common.

in the gravel-pits of Norfolk.

The Opaque, Whitish, Reddish or Yellowish Crystalline STONE, commonly known by the name of the
red, white, and yellow sparry Pebble, is the most
common Stone we have. It consists of a rough irregular and opaque substance, which is pretty firm and
compact in its texture, with a pretty smooth surface,
though often full of cracks, which sometimes penetrate
deep into the body of the Stone. It is met with from
the size of a pea to six or seven inches in diameter,
and is inclinable to a roundish shape, though it is
sometimes stattish, especially on one side. The colour
is much the same without and within, and it is irregularly tinged with different colours. These are some-

times uniform throughout the whole substance of the Stone, but sometimes appear in spots, blotches, and irregular veins. It has a little brightness when broken, and appears to be of a loose texture. They are to be met with in gravel-pits and other places all over

the kingdom.

The Yellowish, White, Spungy STONE, has somewhat of the nature of fand-stones hewn out of quarries. infomuch that it might be mistaken for a fragment of that kind. The texture is coarse, but pretty firm, though there are fmall cavities that give it some resemblance of a sponge; the surface also has the same appearance, and it is generally from half an inch to two inches in diameter. It is pretty heavy, and more or less of a yellowish white, without the least brightness. It is composed of an irregular crystalline matter, debased with a mixture of a whitish and yellowish opaque fubstance. Though it is pretty hard, it will not easily firike fire with steel, nor does it ferment with aqua fortis. When examined with a microscope it appears to be a petrified sponge, for there are more cavities than folid matter.

The Hard, Porous, Whitish, Crystalline STONE has a rough cavernous and fpongy furface; but it has not fo many pores on the infide as the former kind. Thereare veins on the outfide, dispersed in an irregular manner, of different breadths, and often interwoven with each other; likewise they all stand up in ridges above the furface of the Stone. Sometimes the pores on the infide are wanting, which renders the texture the more firm; it is from one inch to fix in diameter, and generally of a flattish shape, though somewhat roundish. It is naturally white, and fometimes has a mixture of faint red, or pale yellow. It is pretty heavy, very hard, and is gloffy when broken, especially in its veins, which are more close and compact than the rest of the mass. It strikes fire with steel, but will not ferment with aqua fortis.

The Greyish, White, Opaque STONE, is of a very close texture, with a smooth even surface; but it is subject to cracks of various sizes, and is from an inch to a foot in diameter, sometimes roundish, and some-

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WATERS, EARTHS, FOSSILS and MINERALS. 229

times flat; but in this last case it is always subject to superficial cracks. It is perfectly opaque and dull when broken, though it consists of an uniform crystalline substance, debased by a mixture of white and grey clay. It is very heavy, pretty hard, and will readily strike sire with steel. This, as well as the two

former, is common in gravel-pits.

The Brittle, White, Sandy STONE, is of a very loose brittle texture, with a pretty smooth regular surface, though it is somewhat rough to the touch; the shape is irregular, though generally slattish, and the size is from one to twelve inches in diameter. It is pretty heavy, and when broken appears of a bright glittering white. It consists of a great deal of pure white sand, to which it may be reduced, and it breaks with the slightest blow into a great number of pieces. It is readily penetrated by water, which will pass throw it unchanged. It will not ferment with aqua fortis. It is not very common, but has been found in the gravel-

pits of Northamptonsbire.

The White Crystalline STONE, with yellow specks. is by some called the Worm-seed Stone. It is of a pretty hard compact texture, and generally has a smooth surface, though sometimes there are irregular cavities. It is of a roundish or oblong shape, and thicker at the middle than at the edges. It is commonly about three or four inches in diameter, and the colour is generally white, though it has fometimes a pale brown caft. The specks are about the breadth of a small pin's head, and are of a very bright pale yellow, by which characteristic it is easily distinguished from all other Stones. The colour is dull on the outfide, but bright and glittering when broken; and it confifts of a large angular grit, extremely well united. It firikes fire with fleel; but does not ferment with aqua fortis. It is common in Yorksbire, and is sometimes found in the gravel-pits near London.

Whitish, Brown, Dull STONE, is softer than any of the former, and yet the texture is pretty even and regular. It is generally above a foot in diameter, and its shape is always broad and flat, with deep longitudinal cracks on the surface, which are crossed with

some that are smaller. It is of a very pale brown, and has sometimes a faint yellowish or reddish tinge. The surface is dull and opaque, and when broken is generally sull of cracks, the largest of which are often silled up with crystals, which look very bright and glittering. It is pretty heavy, and is harder in some places than others. It is found in many parts of England, and particularly on Hampsead Heath, very deep in the ground. It sometimes contains large pieces of petrified wood, which are so stony that they cannot be perceived, except by the knots.

The Blueish, White, Hard, Crystalline STONE, is not of a very fine structure, but firm and close, with a smooth surface. It is generally from three to ten inches in diameter, and of a flattish shape, somewhat approaching to roundness. It is of a dull light lead colour on the outside, but when broken is bright and glossy, and the thin pieces are a little transparent. It is very heavy, will take a sine polish, and readily strikes sire with steel. It is very common on the shores.

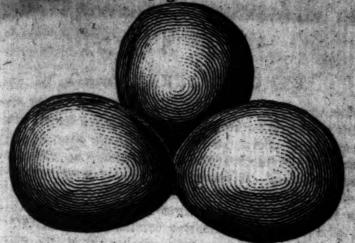
of Italy, France, and England.

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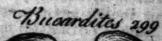
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The Brownish, White, Hard, Shining STONE, is pretty coarse, but very firm, and has a rough irregular furface. It is about fix or feven inches in diameter, though fometimes much fmaller, and at other times extremely large. It is of a dulky white on the outfide, with a fmall mixture of pale brown; but when broken it is bright and glittering, with an unequal furface. It confilts of a grit with blunt angles, together with roundish bright particles, cemented together with a fubfiance nearly as bright. It is fometimes full of black and green specks, of the fize of very small grains of fand. It is pretty heavy, and capable of a good polish; but it will not firike fire with seel. It ferments violently with aqua fortis, . which discovers its nature, which is that of confisting; pretty much of spar. It is found in Derbysbire.

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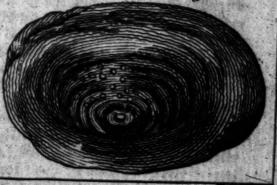




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CHAP. XXXII.

Of Common PEBBLE-STONES.

HE Yellowish Green PEBBLE, with a blueish white cruft, is of a fine close texture, and the furface, though regular, is a little wrinkled. The fhape is roundish or oblong, and the fize from one to five inches in diameter. It has commonly a large nucleus in the center, inclosed in a broad coat, which is covered with a very thin crust. The nucleus is of a. greyish yellow, sometimes perfectly blended together, and fometimes irregularly mixed in the form of clouds or large foots. There are often white opaque foots dispersed here and there, and the nucleus approaches to pure flint. The coat next to it is of a blueish white. and of a somewhat coarser texture. The external crust is of a whiter colour, and is of the same substance, only there is a greater mixture of earth. When. broken it has a smooth glossy surface, and the nucleus. is pretty transparent. It is very hard, will bear a. good polish, and firikes fire with fleel. It is found in the gravel-pits in Northamptonshire, and sometimes in those near London; however, when found, it is of no value.

The Whitish, Grey, and Reddish Coated PEBBLE, with a yellow centre, is more beautiful than the for-mer, and has a fine close texture, with a pretty even furface, though full of wrinkles. It is of a flattifh: round thape, and the common fize is about three inches-in diameter. It is composed of a large nucleus, which is the principal part of the stone, and is of a deep. bright yellow, and pretty transparent. It is some-. times marked with roundish white spots, from the; bigness of a pin's head to that of a pea, and is furrounded with a coat of a pale greyish white, of a: finty substance, which sometimes receives the matter of the nucleus into itself in the form of clouds, making a broad undulated line. This is generally covered ; with a red coat, and that with the external cruft, which confills of a great quantity of earth. When broken it has a glossy surface, and is hard enough to take a polish.

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polish. It is very common on Hampstead Heath, and

in many other places.

The White, Black, Brown, and Straw-coloured PEBBLE, with a yellow nucleus, is a very beautiful stone, and of a fine texture. It is generally of a roundish or oval shape, and seldom exceeds three inches in diameter. The nucleus is large, and is the principal part of the stone. It is surrounded with feveral coats, which resemble the zones of the onyx. The nucleus is very bright, and pretty transparent, and of a deep but not bright yellow. It is fometimes of the fame colour throughout, and has clouds of a different yellow and flint colour, also opaque specks of a palish white, and sometimes likewise the centre is transparent crystal. The nucleus is usually furrounded with a narrow black circular line, and is covered with a coat of a paler yellow than the nucleus, and that by another of an opaque white; the next is of a pale brown, besides which there are four or five others of the same colours placed alternately. These are all covered with a blueish crust, but sometimes with a whitish, and always greatly wrinkled. When broken, the furface is gloffy and pretty trans-parent, is very hard, and will bear a good polish. It firikes fire with steel, but will not ferment with aqua fortis. It is common on Hampstead Heath.

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The Whitish, Blueish, and Brown PEBBLE, with a dull brown nucleus, has a close firm texture, with an even furface, only it is wrinkled. It is generally of a roundish or oval shape somewhat flatted, and the fize is from one to five inches in diameter. The nucleus is pretty large, of a deepish brown, and of a pretty fine texture, but not very transparent or bright. It is commonly furrounded with a broad whitish coat, then with a narrower of the same colour as the nucleus; after that is a third of the same substance with the inner coat, and these are covered by one of a blueish colour, of a more flinty texture than the other part of the Stone, over which there is a crust like the rest, but more earthy. When broken the furface is very bright and glossy, and as it is pretty, a said of deputes best of best tochul whole hard,

WATERS, BARTHS, FOSSILS, and MINERALS. 233

hard, it will bear a good polish. It is common on Hampstead Heath, and in the gravel-pits about London.

The PEBBLE, with white and brown coats, and a thining brown nucleus, is a very pure and beautiful Stone, and has a fine close texture, with the common wrinkled furface of other Pebbles. It is generally of a round or oval form a little flatted, and commonly four or five inches in diameter. The nucleus is very large and oblong, and of a deep bright pleasant brown. It is transparent, though sometimes subject to whitish fpecks. It is furrounded with a coat of a milky white. fometimes mixed with a little pearly blue; and next to that is one of the fame colour with the nucleus, only it is not fo transparent nor bright. Over this is the crust that covers the whole, and in general it is not inferior to an agate. When broken, it has a bright gloffy furface, and where thin is pretty transparent; it is extremely hard, capable of a fine polish, and will firike fire with fleel. It is found in gravelpits, but is not so common as the former.

The PEBBLE, with white, brown and yellow coats, with a fmall brownish yellow nucleus, has a fine close texture, with the wrinkled furface of other Pebbles. It is commonly roundish or oval, and the common fize is about an inch in diameter. The nucleus is about as big as a small nutmeg, and is surrounded by a coat of a dull opaque impure white, and that with one of a pale whitish brown; the next is of a pale red or flesh-colour, and the fourth of a blackish brown. The outer crust is a pale yellow, and as thick as any of the rest. The nucleus is pretty bright, but has little or no transparency; however, this Stone, as well as all others, is subject to some varieties. It is very hard, will bear a fine polish, and readily strikes fire with steel. It is pretty common in the gravel-pits about London, and might be put to good uses by the

lapidaries.

The PEBBLE, with greyish white, pale brown, and reddish coats, with a small brown nucleus, is of a very fine close texture, and has the wrinkled surface common to other Pebbles. The shape is roundish or oval, and is commonly four or five inches in diameter.

The

The nucleus is usually of the fize of a nutmeg, and of a deep brown colour. This is covered with a coat of a pale whitish grey, and that by another that is of the like but thinner, and next to these there are generally four or five of the same colour as the nucleus, and others of a very pale whitish brown alternately disposed. It is more transparent than most other Pebbles, and when broken has a flinty surface; it is very hard, will bear a good polish, and strikes fire with steel. It is common in the gravel-pits on Hamp-

Read Heath.

The PEBBLE with yellow, red, and blueish white coats, with a reddish brown nucleus, is of an exceeding fine firm texture, and is not so wrinkled on the furface as most of the other kinds. It is of a roundish flattish shape, and commonly about three inches in diameter; the nucleus is pretty large, of a very fine texture, and pretty bright and transparent. It is of a pale red, and is inclosed in a coat of a fine pearlcolour or blueish white, which is pure, bright, and transparent; next to this is a fine red coat, and after that feveral pearl-coloured and red coats alternately placed; over these there are three or four coats of a pale yellow, and the outer crust is of a pale blueish colour. It is more transparent than most other Pebbles, and when broken has an even furface; it is very hard, will bear the highest polish, and readily strikes fire with steel. It is common is the gravel-pits about Kenfington, and many other places. It is in some use with our lapidaries.

The PEBBLE, with white, orange, brown, and dusky yellow coats, and a brown nucleus, is of a very fine close texture, with a wrinkled surface, like the rest of the Pebbles. It is of roundish or oval shape, and from one to three inches in diameter. The nucleus is small, and the coat that immediately surrounds it is of a clear white. The next to that is orange, and then there are eight or ten of different colours, composed of brown or yellow, after which are colours of a dusky white, with a fine orange-colour between them. The whole is very pure, bright and transparent, though it is subject to many variations. When broken it has a fine

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WATERS, EARTHS, FOSSILS and MINERALS. 235

a fine gloffy furface, is extremely hard, and confequently will bear a very fine polish. It is common in the gravel-pits on Hampfiead Heath, and in many

other places about London.

The PEBBLE, with whitish, brownish, and yellowish coats, and a brown nucleus, is of a more coarse texture than any of the former, though pretty firm and hard. The surface is more smooth than that of other Pebbles, and is generally pretty round, and between two and three inches in diameter. The nucleus seldom exceeds the fize of a horse-bean, and is surrounded by an irregular undulated coat, composed of others that are narrow; next to this are three or sour others, which are composed partly of a very deep brown, with some that are yellowish, and others of a dusky pale blue. They have all a mean appearance, and are perfectly opaque. They are very scarce, and are of no value.

The PEBBLE, with yellowish, brown, and ashcoloured coats, and a blueish white large nucleus, is a very beautiful flone, and has a fine firm texture with a wrinkled furface. It is generally roundish, and from one to four inches in diameter. The nucleus is large and very beautiful, and fometimes makes the principal part of the flone. It is of an exceeding fine texture, and very bright and transparent, approaching to a white cornelian. It is of the colour of pearl with a blueish white, which is often debased with clouds, spots, and veins of an opaque white. This is furrounded with a yellowish brown coat that is clear and transparent, and then there is another of a pale ash-coloured grey as fine as the former: these are surrounded with the outer crust, which is of a blueish or ash colour; however, the coats and the flones are met with in different proportions. It is more transparent than any of the rest, is very hard, will take a fine polifit, and firike fire with fleel. It is common in the gravel-pits on Hampfead Heath, and about Windfor.

The PEBBLE, with flesh-coloured, brown, and blueish white coats, and a fine large white nucleus, has a fine, close and firm texture, and the furface has

only some slight wrinkles; the shape is roundish or oval, and generally about two or three inches in diameter. The nucleus is oblong, and not so blue as that of the former, but is as sine, bright and transparent. It is encompassed with a great number of coats of a pale brown, blueish white, and a pale white light red placed alternately, and covered with a whitish crust. They seem all to be of an equal degree of brightness and transparency; but it is subject to great variations. It is hard enough to strike sire with steel, and will bear a very sine polish. It is common in the gravel-pits of Hertfordshire, and is

used in London to make tops for snuff-boxes.

The PEBBLE, with red, flesh-coloured and yellow coats, and a white nucleus, is a fine beautiful Stone, and of a very close texture, with a wrinkled furface like that of other Pebbles. It is generally roundish, though fometimes oblong, and is commonly about three inches in diameter. The nucleus is commonly pretty large and opaque, though of a very fine texture, and is frequently full of coarse roundish white This is commonly encompassed by a thin fpots. bright red coat, and that by one of a beautiful bright yellow, next to which there is another of a fleth-colour, and then four, five, or fix others of the same colours, but not placed in an alternate order. They are all very bright, and more transparent than the nucleus. When broken, the furface is fine and fmooth, is very hard, and will take an elegant polish, as well as strike fire with steel. It is common in the

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gravel-pits on Hampftead Heath.

The PEBBLE, with very thin, numerous, brown and yellow coats, and a greyish white nucleus, is of an exceeding fine close texture, with a surface not so much wrinkled as in other Pebbles. It is generally of a roundish shape, and from one to four inches in diameter. The nucleus is large and of a fine texture, but not quite so transparent as the rest of the Stone. The grey and the white are sometimes distinct, and at others blended together; but is subject to small grey opaque spots. The coats are many in number, but only of a pale brownish yellow and a dusky brown colour

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WATERS, EARTHS, FOSSILS and MINERALS. 237

colour placed alternately: They are bright, beautiful, very transparent, and covered with white opaque dull crusts. It has a glossy surface when broken, is very hard, will bear a fine polish, and will strike fire with steel. It is common among gravel in Herr-

fordibireals a various caste a no said certa termina

The PEBBLE, with brown, yellow and white coats. and a greyish white nucleus, is of a fine close texture. with a rugged wrinkled furface; is generally oblong and flattish, and from one inch to five in diameter The nucleus is fometimes no bigger than a horfe-bean, though the Pebble be large; and yet it is fometimes an inch broad in smaller. The surface is glossy, but very opaque, encompassed by many fine regular coats of a fine deep brown, a very pale yellow with a little mixture of brown, and a fine white. The brown is next to the nucleus, and the other colours are placed alternately, but tinged more than one at a time. Its furface is gloffy when broken, and, as it is very hard, will bear a good polish, and strike fire with steel. It is common on Hampstead Heath, and in the gravel-pits about Islington.

The PEBBLE, with white, grey, and flesh-coloured coats, and a very white nucleus, is of an even close texture, with a very rough wrinkled surface, and a flat roundish shape, from two to three inches in diameter. The nucleus is of various sizes, from the bigness of a pea to that of a walnut, and is of a fine texture, but opaque and dull, as are all the other colours. It is irregularly surrounded with many coats of different thicknesses and different colours. When broken, it has a smooth but not a glossy surface, and is so hard as to be capable of a good polish, and strikes fire with steel. It is common in the gravel-pits

about London and same side suche participal

The PEBBLE, with brown, ferruginous, and yellow coats, and a brownish white nucleus, is one of the coarsest of this kind; but the texture is hard and compact, and the surface is not so wrinkled as many others; however, there are several prominences and cavities, which render the shape irregular, though it is generally somewhat oblong. It is from one to four inches

mether.

inches in diameter; and the nucleus is fometimes fo pale, that it is almost white. It is encompassed with four or five coats, whose colours are very good : that next the nucleus is of a rufty-coloured brown, the next to that pale brown; after which is another of a rufty brown, then one of a deep yellow; the next is brown, and then comes the crust, which is of a pale whitish grey. It appears rough when broken, and is fo hard as to strike fire with steel. It is not very common, though it has been met with in different places.

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The PEBBLE, with brown and grey coats, and a blueish nucleus, is of a very fine firm texture, with a fmooth furface, and not to much wrinkled as many others. The shape is oblong, and from one to three inches in diameter. The nucleus is of a pure flinty substance, sometimes of the same uniform colour, but more frequently veined or spotted with a lighter or darker colour of the same kind. This is encompassed with a fine deep brown coat, which is very bright; and that is succeeded by one of an ash-colour, as bright as the nucleus. The crust is next to these, which is pretty thick. It has somewhat more of a transparency than most of this kind; and as it is extremely hard, it is capable of a good polifh. It is

met with in some parts of Hertfordsbire.

The PEBBLE, with thick, whitish, and red coats, and a grey nucleus, is of a very fine texture, but the furface is rough, irregular, and deeply wrinkled. Its shape generally tends to roundish, and it is most commonly an inch and a half in diameter. The nucleus is hard, bright, glossy, and transparent; the next coat is usually red, with a little mixture of rusty brown, and is not so transparent as the other parts of the stone; next to this is a coat of a blueish white or pearl colour, very bright; after this comes the crust, which is thick, coarfe, of a very bright white, and of a loofe stony substance. This is the common appearance of the stone, and sometimes the coats are more numerous. It is very hard, the substance being flinty, and capable of the highest polish. It is not common but has been found in Northamptonsbire, and near Puddington. of Tenerally fomewhat obloce. It is from one to form

The PEBBLE, with white, flesh-colour, and bright red coats, and a blueish white nucleus, is of a sine close even texture, with a very rugged wrinkled surface, and a roundish shape. It is not above two inches in diameter, and the nucleus is surrounded with many white, slesh-coloured, and red crusts, beautifully disposed, but not always alternately; though that next it is generally red, and they all together have a very sine effect. This stone is generally very bright and transparent, and when broken has a smooth glossy surface; it is very hard, and will bear a fine polish. It is very common on Hampstead Heath.

The PEBBLE, with brown, yellow, and flesh-coloured coats, and a greyish blue nucleus, is of an exceeding fine smooth texture, with a surface a little wrinkled, and is of a roundish or oblong shape, but a little flatted, and seldom more than three inches in diameter. The nucleus is very beautiful, bright and transparent. It is encompassed with many coats of a pale brown, and a sine red, which sometimes is of a sless of the debased with small coarse spots, and perhaps

more than any other. When broken, it is of a fine glossy surface, is extremely hard, and capable of a

very fine polish.

The PEBBLE, with white, yellow, flesh-coloured, and red coats, and a greenish blue nucleus, is undoubtedly the most beautiful of the English Pebbles, for it comes up to the German Agates. The texture is exceeding fine, smooth, and hard, with a surface less wrinkled than most other kinds. The shape is roundish or oblong, and from three to four inches in diameter. The nucleus is pretty large, and fometimes round, but more commonly oval. It is of a very fine texture, with a gloffy furface, and in thin pieces quite transparent. It is generally of a deep blueish green, which is sometimes so dark as to appear almost black, and often of a dusky blue; it is likewife fometimes of fo bright a green, that it is not inferior to the green jasper. The coats are fine, and beautifully disposed like the zones of an onyx, and are all bright and transparent. Some are of a bright white.

white, others of a fine deep yellow, others of an agreeable pale flesh-colour, and others again of a bright deep red. The coats are very thin, and lie evenly throughout the whole substance of the stone; but the slesh-colour and white are most commonly near the nucleus, and the yellow towards the surface: however, like most others, it is subject to great varieties. It is more transparent than any other Pebble, and when broken is of a fine even slinty surface, capable of bearing the most perfect polish. It is common in many parts of England, in particular near London in the road to Highgate, and formerly was in great plenty among the gravel in the foot-path from Paneras to Kentish-Town. It is sometimes used by our

lapidaries, but not fo much as it deserves.

The PEBBLE, with whitish, brown, and yellowish coats, and a flesh-coloured nucleus, is of a fine and fmooth texture, with a very firm, rough, unequal, thick crust, it being full of prominences and cavities. The shape is very irregular and uncertain, it being ragged and uneven in feveral parts, and looking more like a flint than a pebble. The fize is from an inch to eight in diameter, and the nucleus is pretty large, with a shape like that of the stone itself. It is of an agreeable flesh-colour, with a slight tinge of blue, and the coats are not above three or four in number, which are of a fine deep brown, a dusky white, and a pale and darkish yellow. The yellow coat lies next the nucleus, the white next to that, and then the brown; and in some a thick yellow coat lies over these, bounded by a very narrow one of deep brown. The furface is of a pale whitish brown, and extremely coarse, being often half an inch thick. It is pretty transparent, when broken has a fine flinty furface, and is fo hard as to bear a very good polish. It may be met with in Yorksbire.

The PEBBLE, with white and brown coats, and a white nucleus, is of a very fine close texture, with a rugged unequal surface, having prominences like warts, with small irregular cavities and deep wrinkles. It is commonly of a roundish, oblong, flattish shape, and from two to three inches in diameter. The nucleus is

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Conchites Oister Stone 292.



Conchites



Snail Stone 299

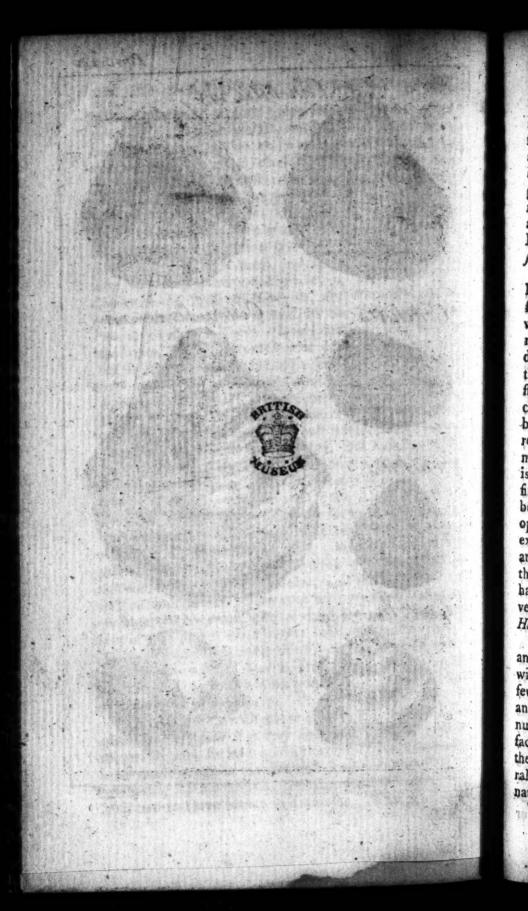




Pear Stone 208



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bright and white, but not very clear; and the new ber of coats is uncertain, being fometimes three or four, and at other times fix or eight; which are all of two colours, a fine deep brown, and a very bright white. The brown parts are very bright and gloffy, and pretty transparent; but the white is much more opaque. When broken it is bright and fmooth, and being extremely hard will bear a pretty fine polish. It is very common in the gravel-pits of Northampton-But the to the life with

bire and Leicestersbire.

The PEBBLE, with black, white, and flesh-coloured coats, and a red nucleus, is of an exceeding fine close texture, with a smooth even surface, the wrinkles being very fuperficial. The shape is generally roundifu, and feldom exceeds three inches in diameter. The nucleus is encompassed with many thin coats of a fine jet black, a clear white, and a flesh-colour. The black is commonly next to the nucleus, then the flesh-colour, and after that the white; but it is fometimes one, and fometimes the other: the rest follow alternately, though not always. The outermost coat is generally of a flesh-colour, and over that is the crust, which is very thin. The nucleus is of a fine bright transparent red, and equal to many of the best cornelians. The slesh-coloured parts are the most opaque of any in the stone; but the black coats are extremely beautiful, being very bright and gloffy, and when thin are pretty transparent. When broken the furface appears to be flinty, it being extremely hard, and capable of an excellent polish, It is not very common; but it has been found on Hampfread Heath, and in the gravel-pits of Northamptonshire.

The PEBBLE, with yellow and greenish white coats. and a yellow nucleus, is of a very fine close texture, with a remarkably smooth surface, it having only a few superficial wrinkles. It is generally pretty round. and between one and three inches in diameter. The nucleus is finall, but of a fine texture, a gloffy furface, and pretty transparent. It is of the colour of the common yellow cornelian, and encompassed generally with but a small number of coats of two colours. namely, a yellow a little deeper than the nucleus, and Vol. V. M a very

a very pleafant whitish green, of which colour the coat next the nucleus always is, and after that is a yellow, next a green, and fo on alternately. The outer coat, on which the thin coult is laid, is fometimes of a pale brownish white, but not always; befides which there are often other varieties. The nucleus and the yellow coats are transparent, and much more fo than the green. It is extremely hard, capable of a fine polish, and readily strikes fire with steel, like the rest of this kind. It is very uncommon, but

has been feen on the shores of Yorksbire.

The PEBBLE, with purple and pale yellow coats, and a red nucleus, is of a fine firm texture; but the furface is remarkably rough, being full of inequalities, though it has but a few deep wrinkles. The shape is irregular, and the fize various, some being less than an inch, and others four inches in diameter. The nucleus is also irregular, and of a strong deep red, though pretty bright and gloffy, but with little transparency. It is surrounded by two or three coats of a fine pale yellow, and a purplish black colour; which last, held up to the light, appear of a fine deep purple. All parts of the stone are bright and glossy, but those that are yellow are most transparent, and there is generally a yellow coat next the nucleus: those that follow are commonly placed alternately, and are pretty thick; there is likewife a yellow one next the outward cruft, which is white within, and yellowish on the furface. This stone is always exceeding hard, and when cut into plates is very transparent. It is very uncommon; but fome have been found on the shores of Suffex, and in the gravel-pits about Oxford.

The PEBBLE, with grey and pale red coats, and a vellow nucleus, is pretty fine and firm, with a smooth even furface, only there are superficial wrinkles. It is generally roundish, and from one to fix inches in diameter. The nucleus is of a dufky yellow, and commonly about the fize of a hazle nut. It is opaque, has a curdled look, and is furrounded by feveral coats of a pale red, placed alternately with some that are thicker, of a pale afh-colour or blueish grey, not unlike some of the paler flints. The pale red or flesh-

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WATERS, EARTHS, FOSSILS, and MINERALS. 243

colour is made for by a mixture of grey, and the outermost coat is usually of this last colour, over which there is a pale blueish grey cruit. This is coarse in compa-rison with one of the former, though it is pretty hard, and takes a tolerable polish. It is found in great plenty on the shores of Vorksbire, and sometimes in

the gravel-pits about London. The PEBBLE, with red, purple, blueish, and brown coats, and a pale grey nucleus, is not of to fine a texture as any of the reft, though it is pretty smooth, and very firm, with a surface surrowed with deep wrinkles. It is commonly of a woundish shape, and about four inches in diameter. The nucleus is of a pale grey, or whitish ash colour, encompassed with a great number of thin coats of feveral colours, as a deep red, a bright purple, a greyish blue, and a glossy brown; these last are more transparent than any of the rest : but these, upon the account of their coarfeness, have but a dull look, which renders the stone less beautiful. The coat next the fione is of a red colour, and thickish, but not clear or bright; next this is one of brown, but the rest of the coats are disposed without any regularity, though they are very prettily variegated. The outer coat is generally of a blueiff grey, and thicker than the reft; but the crust is commonly very thinland whitifft. It has a smooth flinty furface when broken, and is fo hard as to take an even polish. It is not common, though it has been fometimes met with in Herifordfbire: molona 2007 . receinate of contoni souls

The PEBBLE, with black and white coats, and a black nucleus, is of an exceeding fine close texture, with a rough forface; generally full of deep wrinkles and protuberances, of the fize of a horfe-bean. It is of a flattiffi round shape, and commonly four or five inches in diameter; the nucleus is pretty large, and of at fine gioffy black. The contrare of a pearl colour, and black like the nucleus, and placed alternately; but the whitest are the thinnest, and the outermost is always black, and thinner than the rest. The crust that covers the whole is generally very thick, and feems to be of a coarse chalky substance. It is more transparent than any of the former, it being extremely M 2

244 The NATURAL HISTORY of

hard, and when broken has a fine gloffy furface. It will bear a very good polith, and like the rest strikes fire with steel, but will not ferment with aqua fortis any more than they all is pretty common on the Suffex and Yorkshire shores. It is sometimes made into feals and other toys, and looks like an oriental stone.

The PEBBLE, with brown and greyish black coats, and a yellowish brown nucleus, has a pretty fine firm texture, though the furface is rough and unequal, and deeply wrinkled. It is commonly of a flattish round shape, and from two to fix inches in diameter. The nucleus is large, and of a brownish yellow, or tawny, furrounded with a few thick coats, some of which are of a greyish black, and others of a pretty clear brown. The nucleus is generally furrounded with a pale grey coat, after which the brown and darker grey are placed alternately. The outermost coat is always brown, though but thin, and the crust that covers it is thin and blueish, but of a much paler colour on the protuberances, than on the other parts. It is not very transparent, but has a gloffy furface when broken, and is To very hard as to be capable of a good polish. It is to be met with in the gravel-pits of Hertfordsbire, Buckingbamshire, and Northamptonshire.

The PEBBLE, with white and greenish coats, and a pale grey nucleus, is of a pretty fine texture, and very firm, with a smooth surface, without many wrinkles. It is almost always round, and is from one to three inches in diameter. The nucleus is small and round, and encompafied with coats of two colours, some of which are entirely white, and others of a faint greyish green; but a white coat is generally next the nucleus. Sometimes these colours are blended with each other, and have undulated edges running through one another, to the succeeding coat: the outermost coat is of a paler or greyer green than the reft, and but thin, as well as the crust that lies over it, which is of a pale blueish ash colour. It is but little transparent, shough it breaks with an even furface; however, it is so hard as to bear a pretty good polish. It is found on the shores of the river Thames, and sometimes in the gravel-pits about Islington. to was min's monactant

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The PEBBLE, with yellowish brown and black crusts, with a brownish white nucleos, is the Egyptian Pebble of the lapidaries. It has an exceeding fine close texture, and the surface is not fo wrinkled as many of our Pebbles. It is commonly of an oblong shape. though fometimes very irregular; it is of various fizes, but the most common seems to be about four or five inches long. The nucleus is of a very irregular shape. and of different fizes, but is always of a pale whitish brown, and fometimes with veins or foots of a dufky colours. It is also often variegated with the colours' of black trees, thrubs and moffes. When it is large. it foreads itself to much as to have some resemblance to a beaft or fish, or at least some of their parts : likewife some have had the distinct representation of a human face. The nucleus is commonly furrounded with a pretty thick cruft, of a pale brownish yellow, and that by one of black; thefe are encompassed with others which are many in number, partly black, and partly of a deeper or paler vellow. Every part is much of the fame degree of purity; but, if any, the black is finer than the reft. It is met with in Egypt, Arabia, and fome of the illands of the Arebipelago. There is a species of this kind in Germany, and some parts of Suffer, but they are not so fine as the Eg option.

The PEBBLE, with yellow and pale brown coats, and a deep green nucleus, is very beautifully variegated, but is not fo pure as fome of the former, and is of a pretty coarse rough unequal texture, though it bly firm, and has a fmooth furface, with very few wrinkles. It is generally roundish, and from one to five inches in diameter. The nucleus is large, and of a dark dufky green, furrounded by a number of crusts in different stones, which are also different in their thicknesses. Some are of a deep vellow, and others of a pale whitish brown, disposed alternately but one that is whitish, or very pale, usually surrounds the nucleus, and the outer coat is commonly yellow, and pretty thick; the crust is always whitish, and has a chalky look, but not very thicked The furface when broken is not very finooth, and yet is fo hard as to bear a good polish. It has been found on Hampfiead

Heath, and about Kenfington.

C H A P. XXXIII

Of SANDS and GRITS.

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har the most tenant forms of be INE Shining White SAND is generally made use of to dry up the wetness of the ink in writing. left it should blot, and for this reason is almost univerfally known. It is pretty fine, and is generally found very pure, and of a pretty fine white. It has some brightness, and, if it be very good, is a little sparkling, and the particles seem to be much of a fize. It feels a little rough between the fingers, and fettles very quick when mixed with water; but viewed through a microscope the particles appear to be of very different fizes and shapes, though they are all Tomewhat angular. They are all white, and though fome are opaque, many are as transparent as crystal plats. It makes no fermentation with aqua fortis, nor yet any of the reft, and therefore this circumftance needs not be repeated. It is found in many parts of England, in trata of great depth; but as there are fome of yellow fand lying near it, it is no great wonder it should be fometimes mixed therewith. It is of great use in making glass, but not so good as that with flint; however, it does not require so laborious a process. Sands in general will ferve for the same purpose, and they are made use of in some counties to manure stiff clay lands; for though they are barren of themselves, the lands are rendered fertile by their mixture, because they are thereby made more susceptible of water, which otherwise would not penetrate fiff clay. This likewife is the principal part which beftows firmness to bricks, tiles and flone. It is alfo of great ufe in making mortar, which commonly unites the joints of bricks and stones, and renders them immoveable Likewife Sand mixed with mud or clay will make a fort of mortar, but less durable, through often wed in the country for the walls of cottages. It is also Sand that gives a confidence to potters clay; for otherwise Rath, and about Kenfagten, Section and and a second

it would crack when wrought into veffels, and confequently fall in pieces, or at least the vessels would be useless. It sometimes serves for polishing the hardest bodies, and for cleaning those that are tarnished.

The Large Shiming White SAND is coarfe, with respect to the former, though it is generally very pure. It is of a pretty good white, with some brightness and sparkling, and feems to consist of regular uniform particles, which are harfir and rough to the touch. When mixed with water it fettles immediately, leaving no foulness behind it. All the particles are of a somewhat oblong and irregularly angular shape, and when viewed through a microscope, the furfaces appear to he smooth, and as transparent as white glass. It is: of great value among those that make glass, and is

commonly brought out of Kent to London.

Fine White very Shining SAND is the best of all of that colour, it being perfectly pure, pretty heavy, and of a pure white, and is very remarkable for its luftre. It is composed of very uniform particles with even furfaces, and is extremely hard. When thrown into water it finks immediately, without leaving foulness behind it. When viewed through a microscope, the particles appear to be a little oblong, and of irregular angular shape, with a fine clear water, it being little inferior to the pureft crystal; and indeed this and the two former are entirely of that fubfiance, except, assome suppose, there is a small mixture of white earth. It is found on the shores of most of the rivers in Italy, and is of great value in glass-making.

Fine brownish white dull SAND is pretty heavy, but does not thine to the naked eye, for it appears rather like a heap of fine dust. The particles seem to be very regular and uniform, with regard to their size and shape; however, when it is mixed with water it does not subside with such speed as the former, and leaves a whitish muddiness behind it. When viewed by a microscope, the particles appear to be of different shapes and fizes, but chiefly roundish, fome of them having rough furfaces, and others flattish; but they are all more or less transparent. It is M.4

found in Suffer and Kent, but is not made use of for

glass, because better forts are plenty.

Yellowish White Fine Dull SAND is pure, and pretty heavy; but has no brightness. The particles are very small, and seemingly very uniform and regular: to the touch it seems to be softer and finer than most other sands, and yet mixed with water it soon subsides to the bottom, but leaves a yellowish muddiness behind it. When viewed through a microscope, the particles appear to be of irregular shapes, though they have somewhat of a roundness, and the surfaces of many are rough; they are transparent in different degrees, and the colour is not quite the same in all, for some are almost without any. It is met with in all parts of the world.

Reddish White very Fine Dull SAND, is pretty, heavy, and of a whitish colour, tinged with a little sless colour. It has not the least brightness, and the particles seem to be all of a size, though they are exceeding small, and feel harsh to the touch. Shaken together with water, it subsides very slowly, but when thoroughly settled it leaves no muddiness behind; however, when viewed through a microscope, the particles appear to be of different shapes and sizes, some of them being at least twenty times smaller than the rest. They are all more or less transparent, and some of them are perfectly so. There are some of this sort

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in England, particularly in Suffex.

Large Brownish White Shining SAND contains a mixture of coloured particles, and is coarse, heavy, and of a colour which seem to be made up of a mixture of brownish, yellowish and whitish, with a faint reddishness. It is very bright, and its particles, though of different colours, seem to be much of a size to the naked eye. When shook with water it immediately settles, without leaving any soulness. When viewed through a microscope, the particles still appear to be much of a size, and of an oblong shape with angular edges; but there are some that are roundish, and of a fine clear yellow; some dusky, but very beautiful, and some of a pale self-colour. The white particles are perfectly transparent, but the reddish

WATERS, EARTHS, FOSSILS, and MINERALS. 240.

reddish are almost opaque. It is found at Hedgerly,

near Windfor, where it lies among loam.

Large Yellowish White Shining SAND confifts of pretty large coarse particles, which are very heavy, though somewhat less than the former. It is very clean, and remarkably bright and thining, and feels very harsh between the fingers; when mixed with water it subsides immediately, without leaving any muddiness. When the particles are viewed through a microscope, they appear to be of all shapes and figures, though in general they have a tendency to roundness; but they are much of the same fize. They are generally transparent, and are chiefly white, mixed with some of a pale yellow or lemon colour. It is, found all over England, and particularly near Depiford,

Highgate and Hampstead.

Large, Coarfe, Shining, Variegated SAND, is a very common fort, and is a beautiful Sand, thoughnot pure. It differs in its coarfeness and fineness, and in the different shapes of the particles. It is pretty heavy, and of a transparent white colour, variegated with black, red and brown, and of a chalky white, as also with different shades of yellow. The white particles, which are much the most numerous, have a confiderable brightness, and feels very hard, though not fo rough as some others. When viewed through a microscope, it appears to be mixed with small pebbles, that are opaque and of different colours, be-fides fragments of larger pebbles and flints, with many pieces of the white opaque crufts of flints. It is fometimes found in strata by itself, and at other times mixed with gravel. That on the fea shore is always clean and bright, and mixed with fragments of shells: in this last case it will ferment with aqua fortis, which is owing to the shells mixed therewith.

Fine, Dull, Brownish, White SAND, with heterogeneous particles, is of a dead disagreeable colour; but is pretty fine, though not so heavy as many other Sands. There is little or no brightness, excepting a very few white glittering particles, which are here and there interspersed, and which are certainly of a different nature from the other particles. The principal

cipal part feem to be pretty uniform with regard to their fize, and the whole does not appear to harft as other Sand; when shook together in water is sub-fides but stowly, and leaves a brownish foulness behind it. The shining particles, when examined by a microscope, appear to be fragments of tale, for they will not ferment with aqua fortis. It is common almost every where, and is mixed with lime and hair to make mortar for plattering walls and ciclings.

Fine, Dull, Greenish White SAND, with heterogene particles, is pretty fine, though it has a dirty look, and the heterogeneous particles are not many. It is very heavy, is of a deep brownish white, with a fort of a greenish cast, and does not at all glitter except where the heterogene particles lie, which are certainly of a talcky nature. The other particles are not all of the same size, and the whole feels hard and harsh between the singers; when mixed with and shook up with water it settles but slowly, and leaves a whitish brown muddiness. When examined by a microscope, it appears to consist of particles of all shapes and sizes, but mostly with smooth surfaces, and of a different colour. They are generally transparent and of a glossy white; but there are many of a fort of greenish brown, and not so transparent. It is common near Depressed, Black Heath and Woolevich. This is pretty much used for the making of green glass.

Fine Glittering Greyish White SAND, with heterogeneous particles, owes its brightness to the great
quantity of talc it contains; for the sandy particles
are small and sine, and seem to have little or no transparency. It is pretty heavy, and the particles are
irregular in their fizes, but all of them small. The
talc also is of different sizes, but larger than the sand,
though at the same time very thin. It feels hard
and harsh between the singers, and when it has been
mixed with water and shook up, it subsides in a short
time, and leaves the water clear. When examined
by a microscope, the particles seem to be of three different kinds; for besides the talc, there are some that
have a glossy appearance, and a sew that consist of
an opaque spar; for which reason it will seement a

little



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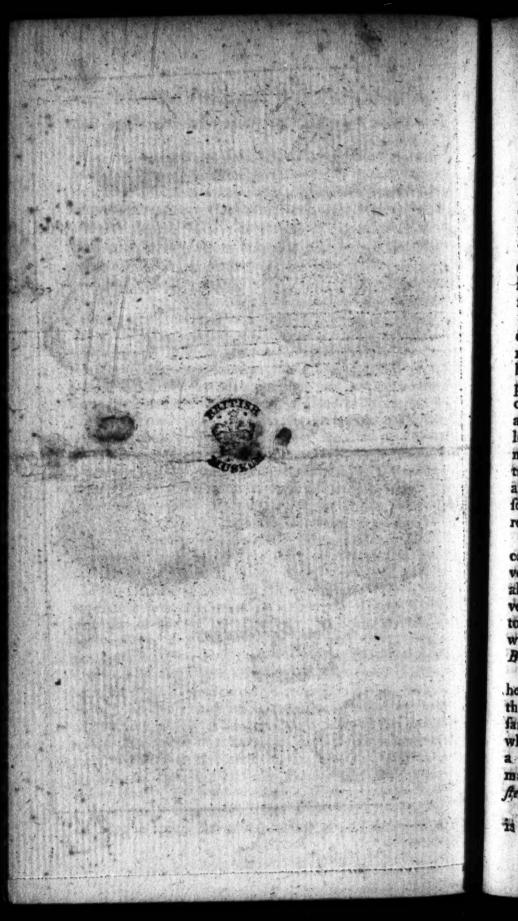




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WATERS, BARTHS, FOSSILS and MENDRADS. 251

little with agus fortis. It is found on the thores of the iflands of Scills.

Large Shining Red SAND confilts of coarse heavy particles, and is of a strong red, approaching to a deep orange colour. It is not quite fo bright as fome of the white fands, but the particles which compose it feem to be pretty much of the fame fize, though of various shapes, with a tendency to roundness. It feels extremely hard and harsh, and when mixed with water subsides immediately, leaving it clear. It is a foreign perculation. fand.

Large Shining Flesh coloured SAND is pretty coarse, very heavy, and is of a bright agreeable pale red, or rather of a field-colour. It is remarkably bright and sparkling, and the particles appear to be pretty much of the fame fize, though not all exactly of the fame colour. It feels very harsh and rough, and when mixed with water subfides immediately. leaving no foulness behind. When examined with a microscope, some have glossy furfaces, others are quite transparent, and others again intirely opaque; many are femi-transparent; and, with regard to the colours, fome are white, others yellow, and others of a pale red. It is common near Naples. Ils auminio vie

Coarfe Shining Brownish SAND, with a reddish cast, consists of large but pure particles which are very heavy, and feeemingly roundish. It is remarkably bright and sparkling, and the particles are of very different fixes. It is no wonder it is very rough to the touch, nor that it subfides immediately in water. It is common on the heaths of Suffex and

Bucking bambire.

Fine, Bright, Shining Brownish Red SAND, is very heavy, and the brown colour is more predominant than the red. The particles from to be nearly of the fame fize and shape, and it feels harsh to the touch; when mixed with water it finks pretty foon, and leaves a whitish muddiness behind it. It is met with in many parts of England, and particularly on Hamp-Read Heath.

Very Fine, Pale, Shining, Brownish Red SAND, is not of an agreeable colour, but is pure, though . M.6. note

252 The NATURAL HISTORY of

not so heavy as many other Sands. It is pretty hard to the touch, and subsides but slowly in water, leaving a reddish brown muddiness behind it. It is common

on the heaths of Suffex.

Very Fine Pale Red SAND, with heterogene particles, is heavy, and of a very pleasant colour, which confifts of a mixture of white, pale brown, and pale red. It glitters pretty much, and is composed of small uniform particles, with a slight mixture of talc. It is harsh to the touch, and when mixed with water fettles but flowly. When examined by a microscope, the particles appear to be roundish and quite transparent. In the fire it loses all its redness, which is a circumstance not very common,

The Fine Palish Brown Yellow SAND makes but a dull appearance, though it is pure, fine, and pretty heavy. The colour feems to be made up of white, pale brown, and pale yellow, which are all very dull. The particles are of different fizes, and so small that they seem soft to the touch, and settle very slowly in water, leaving a whitish muddiness. When examined with a microscope, some of the particles appear to be perfectly transparent, and others almost opaque. It

is very common all over the kingdom.

The Fine Shining Pale Yellow SAND is pretty heavy, and of a fine colour, made up of white, yellow and reddish brown. It is bright and shining, and the particles feem to be tolerably uniform. It is rough to the touch, and fettles but flowly in water, leaving a yellowish muddiness behind it. When examined by a microscope, the particles are found to have different degrees of transparency, and those that are angular are as clear as crystal. It is found about Hampfead and Highgate.

The very Fine, Shining, Pale Yellow SAND, is confiderably heavy, and there is no mixture of any other colours with the yellow. It is also very clean, with uniform particles, which thine pretty much. It is harfh to the touch, and when mixed with water quickly subsides, and leaves it clear. It is found in Kent and Suffex, and other parts of England.

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WATERS, BARTHS, FOSSILS and MINERALS. 255

The Fine, Shining, Gold-coloured SAND, is very pure, and heavy, and is of a fine bright yellow resembling the colour of gold. It glitters pretty much, and seems to consist of uniform particles. It is harsh to the touch, and settles immediately in water, leaving it clear. It is common on Hampstead Heath, and in

most other parts of the kingdom,

The very Coarse, Shining, Pale Yellow SAND, consists of very large heavy particles, and is generally pure, with an unisorm colour. It glitters very much, but the particles are irregular with regard to their size. It is very rough to the touch, and subsides in water immediately. This is commonly called Scouring Sand, and is used by stone-cutters in cutting their hard stones: it also serves to polish those that are designed for the more curious sorts of pavements. It is common in most parts of the kingdom, and particularly may be met with at Hampsiead and Highgate.

The very Coarse, Dull, Whitish Yellow SAND, is generally found among gravel, and is remarkable for its coarseness. It seems to have no brightness, unless viewed very nearly, and its particles are of very different sizes. It is common about London, and in most

other parts of the kingdom.

The Large Shining Yellow SAND is also common among gravel, and is quite pure, though coarse and heavy. It shines pretty much, and the particles are tolerably regular with regard to fize. It is extremely coarse to the touch, and when mixed with water sertles immediately, leaving it clear. When viewed through a microscope, it seems to consist of particles like small pebbles, with pretty smooth surfaces. It is

common about London and other places.

The very Coarse Bright Yellow SAND is always found at considerable depths, and is perfectly pure, though remarkably coarse and rough. The particles are heavy and regular in their fize, and perhaps it feels the roughest of all Sands; when mixed with water, it settles immediately, leaving it clear. Viewed through a microscope, it appears to consist of large crystalline particles of an amber colour, and of the shape of pebbles.

154 THE NATURAL HISTORY OF

pebbles. It is found in Northamptonsbire, and other

places, under the firsts of gravel.

The Large Dull Yellow SAND is of a difagreeable colour, though generally pure. It is confidera ably coarfe, very heavy, and of a little deeper yellow than the former, but is very far from being fo bright. The particles are of a very irregular fize, and though confiderably hard they do not feem fo harsh as any of the former. When mixed with water they quickly fubfide, leaving a little yellow muddiness. When viewed by a microscope, the particles feem to refemble pebbles; but many of their furfaces are very unequal and fomewhat flattish, and others crooked. It is a common Sand, and is found not only in pits, but on the shores of the English rivers. It is used by the plumbers in London as a bed whereon to cast their fleet lead, and is generally brought from Hackney river. It is also used by stone-cutters, in fawing their marble.

The Fine Dull Deep Yellow SAND is pretty fine, though the particles are of different fizes. It is lighter than most other Sands, and the deep yellow colour is entirely without brightness. It is lost to the touch, and when mixed with water subsides very slowly, leaving a yellow muddiness behind it. When viewed through a microscope, the particles seem to be of the shape of common pebbles, with very irregular surfaces; they are pretty transparent, and of an amber colour. Some of the particles are so small, that they appear like dust sticking to the surfaces of the rest. It is common in Willsbire, and is found in other parts of England.

The Very Large Dull Saffron-coloured SAND is very pure, hard, coarse, pretty heavy, and of a deep frong bright yellow. The particles are not all of the same fize; it is hard and rough to the touch, and when mixed with water subsides immediately, leaving it clear. It is found on the Gold Coast of Guinea.

in Africa.

The Coarfe, Shining, Dirty, Yellow SAND, is very pure, large, heavy, and of a deep dufky yellow. The particles glitter pretty much, and feem to

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WATERS, BARTHS, Possies and Miner ALS. 255 be regular and uniform, with regard to their fize. It

is harth and rough to the touch, and when mixed with water quickly feetles, leaving it clear. When viewed by a microscope, the particles appear in the shape of pebbles, and are pretty transparent, though of different degrees of yellow. It is common on Managinal Heath, and many other parts of the kingdom?

The very Coarfe Brownish Yellow SAND is very large, harsh, and considerably heavy; the colour is of a deep, dusky, brownish yellow, but very bright and sparkling. The particles, with regard to size and shape, are very regular, and exceeding harsh to the touch; when mixed with water it foon fubfides, and leaves a brownish yellow muddiness in When viewed through a microscope, the particles appear to be uniform, and in the shape of pebbles, with very unevent mon among the gravel in many parts of England. Bout

The Five Greenish Vellow Pale Dull SAND is of a faint firm colour, with a mixture of green particles, which are generally the largest. The sizes are very irregular, and it is soft to the touch; when mixed with water, it fubfides flowly, and leaves a white muddisness therein. When viewed through a microscope, the particles appear to be different in frape, fize and colour, and the greatest part have uneven surfaces. Some are of the colour of fulplier, others without any colour at all, both of which are very transparent, bu the largest are in shape like common publics, without much transparency, and of a deep dusky green. It is found on Humpstend Heath, and many other places.

The Fine Greeniff Red Pale Dull SAND, in many respects, resembles the former; but it is confiderably lighter than most others, and of a pale yellowish fleshcolour, with a mixture of green speaks. The particles are of different sizes and shapes, those that are
green being considerably larger than the rest, and it is
hard and rough to the touch. When mixed with water it subsides but slowly, and leaves a yellowish brown

muddiness therein. It is common in Suffer.

The very Coarle Shining Blackish Yellow SAND is large, confiderably heavy, and of a deep vellow,

ast The NATURAL HISTORY of

but mixed with black particles. It is very bright and shining for one of this kind, and the particles are nearly of the same size, only those that are black are a little smaller than the rest. It is remarkably rough, and harsh to the touch, and when mixed with water settles immediately, leaving it extremely clear. When viewed by a microscope, the particles appear in the shape of common peobles, and are very bright and transparent, except the black, which are almost opaque.

It is common in fand-pits

The Rine, Shining, Blackish, Straw-coloured SAND, is neither large nor heavy, and the straw-coloured particles are mixed with those that are black. It is very bright and thining, confidering the smallness of its particles; but there are of different fizes, and those that are black are fomewhat larger than most of the reft. It is hard to the touch, but not very rough, and when thrown into water subsides very soon, leaving a little brownish muddiness therein. When viewed thro' a microscope, the particles appear to be of an oblong, blunt, angular shape, and are all very transparent and bright; and even the black particles, which are not very numerous, have some degree of transparency; but they are of a roundish shape, with smooth surfaces. It is common in Suffex, and may be met with in many other places.

The Shining, Coarfe, Blackish, Sulphur-coloured SAND, is hard, heavy, and of a fine brimstone colour, with a considerable mixture of black. The particles are bright and shining, but irregular with regard to size, and are very harsh and rough to the touch; being mixed with water, it subsides immediately, leaving it clear. When viewed with a microscope, the particles appear to be in the shape of pebbles, but are very transparent, and the black stems to be nothing else but fragments of dark coloured flints. It is common

in the fand-pits on Hampftead Heath.

The Shining Fine SAND, of a rufty yellow colour, is very heavy, and of a deep durky yellowish brown, with a mixture of white particles, and others that have no colour at all. The brightness is owing to the last mentioned particles, for those that are yellow and brown

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brown are entirely dull. They are all very irregular, with regard to their fize and shape, and are very harsh to the touch: being mixed with water, they fubfide very foon, and leave a muddiness therein, as if mixed with other. When viewed through a microscope, they all appear to be fomewhat angular, and the greatest part are of the colour of rully iron, and entirely opaque. The to the dates take a mine threates

The Finest Brown Yellow SAND, with heterogeneous particles, is light, and of a pale brownish yellow. with small spangles of tale, which are not very numerous; is sharp and harsh to the touch, and when mixed with water subsides flowly, but leaves it clear. When viewed with a microscope, the particles appear to be roundish, with unequal furfaces nearly of the same fize, and very bright and transparent. The spangles appear to be thin flakes of fine talc, having the appearance of filver. It is common in the fand-pits on Hampflead. Heath.

TALLEC

The Very Fine Yellowish Flesh-coloured SAND is very heavy, and the colour feems to be made up of a pale yellow, and a very pale red: when mixed with a great number of small glittering particles, those that are sandy have also some brightness, and are pretty. uniform with regard to fize; when mixed with water, it subsides very slowly, leaving a yellowish muddiness therein. When viewed with a microscope, the particles appear to be pretty much of the same size and shape, but of different degrees of transparency; some are reddish, others yellowish, and some transparents they are of the shape of common pebbles, and the yellow much more bright and transparent than the red. The spangles are exceeding small, and appear to be thin flakes of tale. It is common in America, and is to be met with in some parts of England.

The Coarfe Straw-coloured SAND, with heterogeneous particles, is very heavy, and of a pleasant pale yellow, with a confiderable brightness, and pretty. large white spangles. It looks very clear, and confifts of regular particles, with regard to the fize. It is tharp to the touch, and, when mixed with water, it fublides immediately, leaving it clear. When viewed,

through

through a microscope, the particles appear to be roundish, very bright and transparent, and the spangles are pretty large thick flakes of talc. It is common in the

fand-pite about London.

The Coarfe Sulphur-coloured SAND, with heterogeneous particles, is pretty heavy, and of a fine pale colour, somewhat between falphur and faffron; it abounds with a great number of flat glittering spangles, which are broader than the other particles. It is harfh and rough to the touch, and when mixed with water subfides immediately, leaving it clear. When viewed through a microscope, the particles appear to be irregular in their fize and shape, and many of them are not very transparent, though most of them are very bright. The shape is like that of common pebbles, and the spangles appear to be fine thin flakes of tales It is common in Italy, and may be met with in Sufferently noting out of or gowin

The very Coarfe, extremely Shining Yellow SAND, with heterogeneous particles, is very heavy, and of a fine yellow, though a little deeper than the ordinary pale gold colour. It giltters very much, and has also a great number of glittering spangles. The particles are regular and uniform, with regard to fize, and it is rough to the touch; being shook in water it subsides in a moment, and yet leaves a little yellow muddiness therein. When viewed through a microscope, the particles appear to be very like small pebbles, and are all pretty transparent. The spangles are pretty numerous, but more white and less transparent than in many other of these Sands, because they are more thicks It may be met with on Hampfread Heath, and

in many other parts of the kingdom.

The Pine Dulky Yellow SAND, with heterogeneous particles, is not heavy, and fomewhat of a brownish yellow. It has a very dull look; but is mixed with glittering spangles, and the particles are very irregular with regard to their fize; however, the fpangles are very few, upon which account it has a more dead look than many others. It is for to the touch, and fubfides but flowly in water, leaving a yellow faulness therein. When viewed through a microscope, the

particles

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WATERS, BARTHS, Possers and Minerald, 299

particles appear to be of various fixes, with unequal furfaces, refembling small pebbles. The spanges consist of very thin tale. It is common in the fand-pits about London, as well as in many other places, and is generally mixed with otherous clay, unless when

found on the flores of rivers

The Large SAND; of a yellow gold colour, with heterogeneous particles, is hard, coarfe, and pretty heavy, and of a deep yellow colour, between faffron and gold. The particles are pretty bright and fhining, but irregular, with regard to their fize, and the white spangles which are large and bright are but few. It is hardh and rough to the touch, and fublides immediately in water, leaving a little yellow foulness therein. When viewed through a microscope, the particles appear in the shape of pebbles, are very transparent, and of a fine yellow; the spangles contift of flac fragments of felenires. It has been mer with in Novthamptonfbire, Kent, and Suffen, omanbe at 11 .

The very Coarfe Saffron-coloured SAND, with hererogeneous particles, is pretty heavy, and of a fine fitting faffron colour, on rather of a deep reddifficulty. The particles thomselves are without brighteness, but it is full of glittering spangles of tale. The particles are very irregular with regard to five, and they are pretty hards to the touch; when mixed with they are pretty hards to the touch; when mixed with water they fettle very flowly, leaving a yellow foul-

anadl.

found in Suffer and Descopersbire. All our translations The very Pine Dufky Saffron coloured SAND, with heterogeneous particles, is not heavy; the colour is a dusky brownish yellow, with somewhat of a brightness ; but the numerous spangles of tale make it appear greatly so. The particles are pretty regular, with regard to size, and the spangles are but little broader than they. It is bash to the touch, settles flowly in water, and leaves a brownish muddiness therein. When viewed through a microscope, the particles appearances he death. pear to be finall, and in the frape of pebbles, but not very transparent, the spangles appear to be thin flakes of tales to is common in the land-pits about High these whiteh feeth to be a fort of flint of different

260 TH NATURAL HISTORY

ate and Hump leady and in other parts of the king-

dome of The Brown Dulk SAND confilts of particles, which are not very heavy non bright, informuch that they appear like a heap of duft; however, they are pretty regular and uniform, with regard to fize, and are harfh to the touch; in water it subfides but flowly, and leaves a muddiness therein. Through a microscope, the particles refemble finall pebbles with ght. It is met with in the fand-pits about Woolwich and Blackheath as south and la lay were

The very Coarse Shining Pale Brown SAND is one of the coarfest that is met with in this kingdom, though it is not remarkably heavy. The particles are pretty bright and sparkling, and regular with regard to fize. It is very coarse and harsh to the touch, and mixed with water subfides immediately, leaving

it clear. It is common about Woolwich.

The very Coarfe Shining Dufky Purple SAND is very large and heavy, and of a deep purplish brown or chocolate colour, interspersed with white. The brightness is in a great measure owing to the white particles, and it is very rough to the touch; when mixed with water it subsides almost immediately, leaving a fomewhat yellow muddinels therein; through a microscope, the particles appear to be much of the fame fize and shape, being roundish. They are of two different colours, namely, chocolate colour, and white, which last are always smooth, and the former rough. It is to be met with near the Hot-Well at Briffel destile the realisment dries and by Thinward, with

The Dull Brown Coarfe SAND, with heterogeneous particles, is pretty heavy and of a pale brown, but very dull. The particles are irregular with regard to fize and colour, fome being much browner and coarfer than the rest. When mixed with water, it subsides immediately, leaving it clear. When viewed through a microscope, the particles appear of different shapes and fizes, but chiefly like peobles, and pretty bright, and transparent. There are flattish fragments among them, which feem to be a fort of flint of different Thapes,

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shapes, and there are others which are fragments of spar, upon which account it will ferment with aquafortis. It is met with near Oxford.

The very Coarse Shining Pale Brown SAND, with heterogeneous particles, is large, pretty heavy, and of a faint pale brown colour; the particles are bright and pretty uniform, with regard to fize. It is harsh to the touch, and mixed with water subsides immediately, leaving it clear. When viewed through a microscope, the particles appear to be of different shapes and colours, some being opaque and blueish, others transparent and inclining to yellow; but the greatest number are in the shape of pebbles with smooth surfaces, and of different degrees of a pale brown. Also there are many fragments of white brown transparent spar, upon which account it will ferment a little with aqua fortis.

Small Shining Greyish Black SAND is perfectly pure, and considerably fine and heavy; the colour is of a bright greyish black, and has a very agreeable look, the particles being uniform, both with regard to shape and size, and of a considerable brightness. It is harsh to the touch, and when mixed with water settles but slowly, though it does not leave the least soulness therein. When viewed through a microscope, it seems to be very bright and quite transparent, the particles appearing to be of an obtusely angular figure, and without any manner of colour. It is brought

from Italy, where it is common.

The Fine very Shining Reddish Black SAND is clean, heavy and variegated with pale red, slesh-co-lour and white. The brightness is inherent in the particles it consists of, which are nearly of the same size, though different in shape, those that are black appearing roundish, and the others stat. It is sharp and harsh to the touch, and when mixed with water settles immediately, leaving it very clear. Viewed through a microscope, the particles appear like different gems; those that are black are almost opaque, with smooth surfaces and pretty round, but the others are all very bright and quite transparent, some being toundish and others stat. It has been hitherto found

only in America, on the fides of hills and the flores of riveres them and the it will be account it will be made a proper of the country of t

The Coarse Dusky Green SAND, variegated with white, is pretsy heavy, and of a deep dust green, with a considerable number of white particles. They are all nearly of the same size, but of different shapes. It is commonly harsh to the touch, and when unixed with water settles immediately, leaving it entirely slear. Viewed through a migroscope, the white particles appear to be of two sorts, some of which are shalf transparent and cloudy, with obtuse angles, and others have sharper ridges, but are bright and quite without colour, besides which there are a sew tinged with a faint yellow. The green particles, which are most numerous, are of a deep yellowish green, and of various shapes. It is brought from Virginia, where it is common.

The Fine Snow-white Stony GRIT is a perfectly pure and homogene substance, and small in proportion to its weight. Its particles are very bright and spark-ling, and very regular in the size. It is harsh to the touch, subsides immediately in water, and leaves it quite clear. It ferments violently with aqua fortis; for which reason it seems to be composed of a very size spare. It has been found in Mendip Hills in Somerfet-spire, in the perpendicular sustances of the strata of stone.

The Dull, Coarse, White, Stony GRIT, is much inferior to the former; for though it is perfectly pure, it is very hard and coarse. The colour is dull, there being little or no brightness; but the particles are very regular, with regard to their size. It is harsh to the touch, and in water subsides immediately, leaving it of a fort of milky colour. This also ferments briskly with aqua fortis, and therefore must consist of spar. It is met with in the same places as the former.

The Fine Cream-coloured Stony GRIT is pale, very heavy, and of a yellowish white or cream colour. It is very bright and sparkling, and confists of particles that are irregular with regard to fixe. It is harsh to the touch, and in water subsides immediately, leaving it a little milky. Viewed through a microscope,

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WATERS, KARTHS, FOSSILS, and MINERALS. 263

the particles appear to be of different shapes and fizes. They are all pretty transparent and bright, and seem to be without any colour. It consists of spar, for it will ferment violently with aqua fortis. It is found

in one of the islands of the Archipelago.

The very Coarse Bright White Stony GRIT is very impure, and consides of two forts of particles. It is very heavy, and of a dusky white colour, which however glitters in some places. The particles are all large, but very different in size, shape and colour. It is hard and harsh to the touch, and in water leaves a little milky soulness. Viewed through a microscope, it appears to be composed of a consused mixture of crystalline and sparry particles. It ferments strongly with aqua fortis, and a thin stratum of it has been found near Loughborough in Leicestersbire.

The Very Coarse, White, Stony GRIT, with heterogene particles, is considerably heavy, and of a pure
white, with black, yellow, and white stakes of talc.

It is harsh and gritty to the touch, and subsides immediately in water, leaving a little whiteness therein.

When viewed through a microscope, it appears to consist of large irregular particles, pretty transparent, and
very white. The particles of talc have all very glossy
surfaces, though of different kinds; but will not ferment with aqua fortis. It is common in Waler on the

fea thore under cliffs.

The Dull White Fine Stony GRIT is heavy, and of a dull whitish colour, with particles that appear to be much of the same size. It is rough to the touch, subsides quickly in water, and leaves a soulness therein. Viewed through a microscope, it appears to consist of opaque particles with rough surfaces, and of no certain shape. Among these there are a few loose specks, with surfaces as bright as crystal. It seements violently with aqua fortis, and is entirely white when burnt. It is common in Derbyshire, and other places, where there are strata of stone.

The Dull, White, Coarse, Stony GRIT, is hard, pretty heavy, and void of brightness, and the particles are of different sizes and shapes. It is hard to the touch, and when mixed with water subsides immediately.

mediately, leaving a muddiness therein. Viewed through a microscope, the particles appear to have rough surfaces, and are quite opaque; but there are a few very small shining crystalline specks. It setments very strongly with aqua fortis, and when burnt is entirely white. It is common in Yorkshire, and some other counties, where there are very large strata of it.

The Brownish White Fine Stony GRIT resembles the former, is not very heavy, and void of all manner of brightness. The particles differ both in shape and size, and are not very rough or hard to the touch. When mixed with water, it leaves a muddiness therein after the subsidence. When viewed through a microscope, the particles seem to be of a loose spongy texture, and opaque, only there are a sew shining specks in some parts. It is met with in the great stone quarry near Bath, in the cavities of the stone, and serments briskly with aqua fortis. It

is also common in Leicestersbire.

Glittering Greyish White Fine Stony GRIT, with heterogeneous particles, is pretty heavy, and of a pleasant pale greyish white. The particles are mixed with fine shining white spangles, and are different with regard to size, without the least brightness. The glittering proceeds from a mixture of a considerable quantity of talc. It is hard and rough to the touch, and when mixed with water subsides but slowly, leaving a whitish muddiness therein. When viewed through a microscope, the particles appear to be different, both with regard to size and shape, and besides the talc there are a few crystalline specks. It ferments violently with aqua fortis, and is common in the hills of Yorksbire.

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Greenish White Stony GRIT, with heterogeneous particles, is pretty fine, very heavy, and of a dusky greenish white colour. The particles are different, both with regard to fize and shape, without any brightness; but there is a mixture of broad flat particles of tale, which makes it glitter pretty much; it is not very rough to the touch, and when mixed with water subsides but slowly, leaving a greenish muddiness therein.

WATERS, EARTHS, FOSSILS and MINERALS. 265

therein. When viewed through a microscope, it appears to consist of stony particles, which are different both with regard to their shape and size; but they are pretty transparent and bright, and the white talc appears in stakes. When burnt, it is of a pale brownish colour, and is met with in some parts of this kingdom.

The Coarse Greenish Grey Dull Stony GRIT, with a few heterogeneous particles, is very large, harsh, pretty heavy, and of a dull greenish grey colour, intermixed with a very sew talky spangles, which are much less than the stony particles, that are alike both with regard to their size and shape. It feels pretty harsh and rough, and subsides immediately in water, leaving it quite clear. When viewed through a microscope, the whitish coarse particles, though not bright, are a little transparent, and there is here and there a crystalline speck, besides the particles of talc. It burns to a pale dusky red, and is common in York-

fire and other places.

The GRIT, called the Puteolan powder by the ancients, is a fort of greyish powder, composed of particles which are so exceeding small, that, when viewed through the best microscopes, no distinction appears among them. It looks perfectly dull of itself, for what brightness there is may be probably owing to the talky particles. When mixed with water, it subsides very slowly, leaving a great whitish muddiness therein. When mixed with salt water, it soon dries into a hard stony mass, which will not afterwards easily dissolve when mixed with common water. It was used by the ancients as a mixture for their cements of buildings near the sea. It is now known by the name of the Pozzolane, and is an ingredient of hard plasters, in several parts of France and Italy.

Fine Pale Reddish Stony GRIT is heavy, and of a very pale whitish or brownish red; it is very bright and sparkling, and even to a greater degree than many of the sands. It is harsh and rough to the touch, and mixed with water subsides immediately, leaving it entirely clear. The particles, when viewed through a microscope, appear to be of irregular shapes, some of

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which are of a pale red, others brownish, and others without any colour at all. It ferments flightly with aqua fortis, and undergoes little change in the fire.

It has been found near Briftol.

The Pale Red, Shining, Coarfe, Stony GRIT, is pretty heavy, with particles that are irregular, with regard to their fize, and remarkably bright. It is very harsh to the touch, and immediately subsides in water. leaving it extremely clear. When viewed through a microscope, the particles appear to be crystalline and quite transparent, but of irregular shapes; some of them are without colour, and others are of a very pale red. It will not ferment with aqua fortis, nor will the fire produce any great change. It is found on the

coast of Fife, in Scotland.

The Greyish Red, Coarfe, Shining, Stony GRIT. is very heavy, and the particles are of various shapes and fizes, many of which are very bright and fhining, and others quite opaque. It is very harsh and hard to the touch, and immediately subsides in water, leaving it very clear. When viewed through a microscope, some of the particles appear to be white, and very opaque; others are without colour and transparent, and others again are stained with a pale red. It ferments frongly with aqua fortis, and burns to a fine red. It is found on the shores of the island of Minorca.

The very Coarse Greenish Red Dull GRIT is very heavy, and of a fine fielh colour, variegated with green. The particles are pretty uniform and regular, with regard to their fize, and they are of an irregular angular shape. It is very hard to the touch, and subfides immediately in water, leaving it clear. Through a microscope, some of the particles appear to be whitish, others of a pale red, and others of a fine light green; but they are all pretty transparent. It is found on the Thores of the Mediterranean fea.

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The Fine Shining GRIT, of the colour of rufty iron, but darker, is full of spangles that appear bright and glittering, which are not tale but crystalline, and without any colour. They are much of the same fize, and extremely harsh to the touch; they subside very fcon in water, leaving it extremely clear. Through a mieroscope,

WATERS, BARTHS, FOSSILS, and MINERALS. 267

a microscope, the particles appear to be of different colours; for some are whitith, others yellowish and femi-transparent, and others without any colour, and as bright as crystal; but the greatest number are

brown. It is found near Lifton in Portugal.

Fine Red Stony GRIT, with heterogeneous particles, is very heavy, and of an agreeable red colours with a whitish cast. The stony particles are a little bright, but the mixture of glittering flat spangles tenders the mass extremely so. All the particles seem to be uniform with regard to their fize, and are very rough to the touch; in water they subside immediately, leaving it quite clear. Through a microscope, the particles of this grit appear to be transparent cryfial, of a pale red, and all fomewhat angular, interspersed with very bright transparent particles of brownish white talc. It is found on the shores of the island of Minorca.

The Coarfe Red Variegated GRIT, with heterogeneous particles, is very bright and heavy, though light and coarfe; the colour is variegated, though the red predominates, and the particles of that part are very bright and sparkling; besides these, there are many white crystalline fragments, and a vast variety of vellow and black flakes of tale, all which glitter very much, and give the whole a pretty pleasing appearance. They are all nearly of the same size, feel extremely harsh and rough, and in water subside immediately, leaving it clear. It is found on the coast of

Scotland.

The very Coarfe, extremely Shining, Flesh-coloured. Variegated GRIT, with heterogeneous particles, is more beautiful than the former, and pretty heavy. The flesh colour or pale red is very lively, and variegated with black and brown particles of tale, besides some that are white and crystalline; and all the particles in general are very bright and glittering, but irregular with regard to their fize. It is hard and harsh to the touch, and subfides immediately in water, leaving it clear. When viewed through a microscope, the particles all appear to be large and coarfe, but of very different shapes and colours, though some are reddish N 2

and yellowish, others without colour, and others again, that are blackish and reddish, or opaque. The talky spangles are brown and black, for there are none that are white.

The Fine Brownish Red Variegated GRIT, with heterogeneous particles, is not fo glittering as the former; but it is very fine, heavy, and of a faint brownish red, variegated with white, black and vellow. The particles are all bright and shining, and much of the same fize. It is sharp to the touch, and in water subsides but slowly; however, it leaves it clear. The particles, when viewed through a microfcope, appear to be of irregular shapes, some of which feem to be spar, are semi-transparent, and whitish, reddish, or brownish; others are crystalline without colour, though fome are reddish or brownish and very bright, and others opaque and stony, and of a blackish or reddish colour. Those with the talky flakes make a very agreeable appearance, for they are of different colours, as white, yellow, and black. It ferments a little with aqua fortis, but undergoes no change in the fire.

The Fine Flesh-coloured Variegated GRIT, with heterogeneous particles, is not so beautiful as any of the former, though it is very fine, pretty heavy, of a bright slesh-colour, and very glittering. The particles are all nearly of the same size, and there is little variegation of white and black. It is sharp to the touch, and subsides immediately in water, leaving it clear. When viewed through a microscope, the particles appear to be of very irregular shapes, and some are white, others reddish, and others without any colour at all. They are not all equally transparent, but the greatest part of them are very bright, and there is a mixture of slaky spangles of tale, of white, brown, and black colours, with a few blackish stony particles.

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It burns to a paler colour.

The extremely Pale, Whitish Red, Variegated GRIT, with heterogeneous particles, is not so finely coloured as some of the former; but it is extremely fine, very heavy, and of a pale whitish slesh-colour. It is variegated with many black spangles, the particles

WATERS, EARTHS, FOSSILS and MINERALS. 269

particles are all very bright and glittering, and are nearly of the same fize. The talky spangles are black, and remarkably thin. It is sharp to the touch; and, though it subsides slowly in water, it leaves it very clear. When viewed through a microscope, all the particles appear to be transparent, except a few that are black, and the fire turns it to a grey colour. This and the four former are common on the shores of

islands in the northern parts of the world.

The Brownish Red Coarse Stony GRIT, with heterogeneous particles, is confiderably heavy, and of a fine pale flesh-colour, variegated with brown, and there are a few glittering plates of white talc. The particles are regular with regard to their fize, and pretty bright and shining, which render the whole mass very glittering. It is sharp and harsh to the touch, and fubfides immediately in water, leaving a little muddiness therein. Through a microscope, the particles appear of different shapes; but most of them are flattish and bright, though not very transparent. Some are of different degrees of flesh-colour, others of no colour at all, and there are also brown particles that are more transparent than the rest. There are a few spangles of white tale, which are very thin, and smaller than the other particles. It burns to a little pale red. It is met with on the shores of the Red Sea.

The very Coarfe Shining Blackish Flesh-coloured GRIT, with heterogeneous particles, is remarkably heavy, and of a mixed colour, between pale red and black, and the particles are bright and shining, besides which there are a few black stakes of talc, but not so large as the other particles, though they are of different sizes. They are very hard to the touch, and subside immediately in water, leaving it clear. Through a microscope, the particles appear of various colours, shapes and sizes; for some are white, others of a pale red, and a great number are black, and though they are not transparent, they shine more than the rest. It does not undergo any change in the fire. It is sound on the shores of the islands of Sicily.

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The very Coarse Shining Reddish Green Stony GRIT, with heterogeneous particles, is considerably heavy, and a reddish green, or rather of a greenish red. The particles are partly green and partly red, intermixed with many that are white, and all together are bright and sparkling: there are also a sew spangles of greenish white talc. All the particles are nearly of the same size, and are very hard and sharp to the touch; they subside immediately in water, leaving a reddish muddiness therein. It is found on the shores of the Mediterranean sea.

The CHRYSOCOLLA of the ancients is a beautiful green, though dull Grit; it is fomewhat coarle, moderately heavy, and of an exceeding lively and agreeable green, with very uniform particles, which are nearly of the fame fize, but of little brightness, It is not very harsh to the touch, and subsides immediately in water, leaving it quite clear. Through a microscope the particles appear to be pure, and in angular figures, generally approaching to a rhomboidal form. It ferments strongly with aqua fortis, and tinges it with a blueish green. It is found on the shores of New England, and is taken to be green fand; it has also been brought from the shores of the Red Sea. It is used by goldsmiths for the soldering gold, and by painters as a colour. That is looked upon to be the best, which comes nearest the colour of an emerald.

The Fine Shining Pale Green GRIT is very heavy, and variegated with white; it is very bright and shining, the particles are regular in their fize, and it is harsh and sharp to the touch; it subsides immediately in water, leaving it entirely clear. It is found

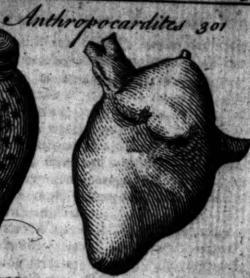
upon the shores of the Red Sea.

The Shining Gold-coloured GRIT, with heterogeneous particles, is light in comparison of many others. The flakes are of different fizes, and it is softer to the touch than any other kind; it subsides slowly in water, and leaves a whitish yellow muddiness therein. Through a microscope, the stony particles appear to be reddish, whitish, and seemingly transparent. It is sound in Virginia, Germany, France, and England.

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WATERS, ERRTHS, FOSSILS and MINERALS. 271

The very Hard Fine Black GRIT, variegated with white, is the hardest, heaviest, and brightest of all the Grits, and is of a fine jet black colour, with a few species of white. It consists of particles nearly of the same size, and is exceeding hard to the touch; it subsides immediately in water, and leaves it entirely clear. Through a microscope, the particles appear to be all angular, of which some are whitish, and others greyish, but both are very transparent; yet those of a jet black, which are most numerous, are entirely opaque. It is met with in France.

The Fine Black and White GRIT, with heterogeneous particles, is pretty heavy, and the principal particles are bright and thining, but they are rendered more to by the mixture of fine white flakes of tale; it is harft and tharp to the touch, and subsides very soon in water, leaving it quite clear. Through a microscope, the black particles appear to be opaque, and there are a great many transparent, without any colour, and exceeding bright; the slakes of tale are also transparent. It is brought from the shores of the Me-

diterranean fea.

The very Coarse Black and White GRIT, with heterogeneous particles, is extremely heavy, and its particles seem to be all nearly of the same size; the greatest part seem to be coarse and dull, but there are a sew that are bright; however, the quantity of tale makes it glitter pretty much; for they are white and glossy. It is rough to the touch, and subsides immediately in water, leaving it very clear. Through a microscope, it seems to consist of a great number of white semi-transparent particles, of which there are some as clear as crystal, and very bright, besides many of coarse white tale, and a great many others that are black and opaque. When burnt it is of a sless colour, with black and white spots. It is found in Wales.

The Shining GRIT, of a rufty black colour, with heterogeneous particles, is confiderably fine and heavy, but entirely dull of itself, though the great number of black flat shining particles make it shine very much. It is harsh and rough to the touch, and settles immediately in water, leaving it entirely clear. Through a microscope, it appears to consist of different particles;

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and those without colour, as well as the yellowish and reddish, are like small pebbles; these are bright and pretty transparent, befides which there are many others of uncertain shapes, and quite opaque: these seem to be fragments of stones of different kinds; and there are a great many that are dusky, with somewhat of a reddish colour, supposed to be pieces of iron ore. Befides these, there are multitudes of spangles of different shapes and fizes, which are all very bright, and are taken for fragments of lead ore. In the fire it becomes blacker, and is known in England by the 1.25272

name of black writing fand.

The Coarse Sparkling Brownish Black GRIT is much like the former, but is more coarse, and remarkably heavy. It owes its foarkling to flat shining particles like the former, though they are not fo many in number. It is very sharp to the touch, and subsides in water immediately, leaving a little blackness therein. Through a microscope, the particles appear to be various, of different shapes and figures, but nearly of the same fize. They are partly fragments of stone, and partly iron and lead ores; but they are not for bright as in the former, they having smaller surfaces. The iron ore is discovered in this by means of a loadstone, as well as in the former. It is common on the shores of Wales, and serves for the same purpose as the preceding.

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The Fine Brownish Black Sparkling GRIT is pretty fine, and remarkably heavy, with an agreeable blueith black bright colour. The particles are of various fhapes and fizes, and it is pretty harsh to the touch; it subsides immediately in water, and leaves it quite clear. Through a microscope, the particles appear to be of various colours; for fome are reddiff, fome greenish, and others blackish, mixed among a vast number of particles of various fizes and shapes, but all of a blueish black, with glossy surfaces. It ferments flightly with aqua fortis, which is probably owing to the sparry matter contained therein. It is common

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correction and the continuous and the telephone and the continuous and

on the shores of Wales.

CHAP. XXXIV.

OF MARCHASITES and PYRITES, or FIRE STONES.

HE generality of Authors think Marchafites and Pyrites to be the same substance, and others distinguish them, making two different species thereof. Boet observes, there are several kinds of Pyrites, and that all stones, that strike fire properly, deserve that name. Some are bright like filver, others confift of several coats, others are like dice. Some are like red marble, and shine with a metalline splendour, others are purple, quadrangular and transparent, and others again are spongy and shining or pumiceous. Some have eight angles, others have twelve, others are like bismuth, and others again are tinged with a gold-colour, from whence they take the name of Marchafites. Some are of a copper-colour; others are of various colours and forms, and others are mixed with flones. Among these, some will melt in the fire, and are added to metals instead of lead, to render them more fusible. and when they are broken they shine like fugar-candy. He adds to this, that there are stones called Pyrites, which will not strike fire with steel, and these he thinks ought not to be placed in that class. Among the Marchasites so called by some there are,

The Silver-coloured MARCHASITE, which is of a very firm and compact texture, and remarkably heavy. It is found making firata of itself, which though very broad are thin, being from three inches to a foot in thickness. Sometimes there are pieces found by themselves, and in general they have a very irregular and unequal surface, they being made up of great numbers of irregular slakes, and of various sizes; they being bent, undulated, and sometimes infold each other. However, these plates are not at all distinguishable by the naked eye, but seem to constitute one solid mass. The colour resembles that of silver, but is more glittering. It readily strikes fire with steel, but will not ferment with aqua fortis; and when

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put into the fire it cracks and breaks, emitting a blue flame with the smell of brimstone. After it has burnt a considerable time, it turns to a deep red. Sometimes this Marchasite is mixed with lead ore, sometimes with that of tin, and very often a dusky brown ferruginous substance. It is found in great plenty in

lead and tin mines.

The gold-coloured MARCHASITE is more glittering than the former, but not fo compact, though pretty heavy. It is commonly found in thin strata, and fometimes in pieces. It feems to be composed of flat flakes, not unlike great numbers of irregular fragments of leaf gold, placed together without the leaft order. However, fome parts of this Marchafite are more loose and open than others, though it is all in its natural shape of a deep yellow gold-colour; however, it is sometimes paler, sometimes deeper, and at other times will reflect all the colours of the rainbow. It will not strike fire with steel so readily as the former, nor will it ferment with aqua fortis. When thrown into the fire, it will flowly emit a blue flame from all parts of its surface. It is plenty in Germany, particularly in Hartz forest, and has been met with in England, but not fo often as in the former.

Heavy white MARCHASITE is very firm and solid, and more heavy than the other two. It is often found in strata by itself, and sometimes in detached pieces; but is more commonly met with in the cavities of other strata, of the breadth of several yards. It has a smoother surface than the others, and is more uniform in its composition; though, if it be carefully examined, it seems to consist of undulated slakes laid closely upon each other. It strikes fire with steel; it will not ferment with aqua fortis, and when put into the fire burns pretty briskly, emitting a blue slame, with the smell of brimstone. It is found in Devonsbire, Cornwall, and some other counties. These are all the Marchasites properly so called, taken notice

of by authors.

The flat Pyrites or FIRE-STONE, with a rough coat, can hardly be distinguished from other Stones by its external appearance. It is pretty firm and hard,

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WATERS, FARTHS, FOSSILS, and MINERALS. 275

as well as heavy, and is of no certain fize, being found from one inch to ten in diameter. It is always flat and thin, and has very unequal and irregular edges. When it is about four inches long, it is half an inch. thick, and requires a strong blow to break it in pieces. When broken its texture feems to be regular and uniform, confishing of one homogeneous mass, of a dusky brownish green colour, surrounded with a coat of a dusky ferruginous substance, which is rough and beset with small pebbles of different shapes and fizes, though generally no bigger than grains of fand. It is always of the colour of rufty iron, and is thicker in fome than in others. It will ftrike fire with fteel, but not ferment with aqua fortis; and in the fire it emits: a blue flame which foon goes out, and when fefficiently burnt it turns to a deep purple. It is found in gravelpits all over the kingdom. nead (kead and made of a recorded &

The Round PYRITES, with a cracked coat, is coarfer than the former, it being composed of visible grit. It is very heavy, and of various sizes, from half an inch to twelve in diameter, and requires a strong blow to break it. The colour is pale, with a mixture of dull whitish green, and a dusky brownish cloud. The outer coat or crust is, of a brownish yellow, and of different thickness; the surface is divided by shallow cracks, and after it has been for some time in the air, they become deeper. It readily strikes fire with steel, and in the fire emits a strong blue stame, and last of all calcines to a purple powder. It is common in the chalk-pits of Kent, and many other places.

The Flat PYRITES, with a very thick whitish brown crust, is extremely hard and firm, though moderately heavy. It is commonly stat and round, or oval, and its usual fize is two inches and a half in length, two in breadth, and one in depth. The surface is rough, it being sull of small tubercles, and it has the look of a lump of brownish clay; it requires a smart blow to break it, and when broken, a nucleus is found of the same shape with the whole stone. This is very compact, firm, and hard, and of a deep dusky green. The nucleus will strike fire with steel, and burns to a red; but the crust itself turns

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to a pale brick colour. It was found in a clay-pit near the end of Gray's-Inn-Lane, and very probably

may be met with in many other places.

The Green PYRITES, without a crust, is met with in a great variety of different shapes. It is of a hard firm close texture, and very heavy, and is found from half an inch to ten inches and upwards in length. Sometimes it is in the shape of a common pebble, but it is more generally slat, with an uneven undulated surface, and seems to consist of many plates laid one upon another. It is extremely hard before it has been exposed long to the air, and is, both within and without, of a pale silvery green. It readily strikes sire with steel, but will not ferment with aqua fortis; it readily cracks and breaks in the sire, emitting a fine deep blue slame, and turning at last to a florid red. It is very common in all parts of England, particularly in strata of blue clay.

The PYRITES, refembling a bunch of grapes without a coat, is of a firm hard structure, and remarkably heavy. It is commonly small, and of a longish form, though sometimes round, and many pounds in weight. It is most commonly without any crust, and requires a strong blow to break it. When broken, it appears to be a kind of a metallic body. It is most commonly of a very pale green, though sometimes deeper, and the surface is always covered with tubercles of various sizes, so as to have a distant resemblance of a bunch of grapes. It strikes fire readily with steel, emits a blue stame in the fire, and soon falls to pieces; but at length turns to a beautiful purple. It is common in many parts of England, and when it has been long exposed to the air, has often a thin coat of a

rufty colour.

The Round PYRITES, with a streaked structure, and an irregular surface, is very heavy, and is usually found in a roundish shape. The general size is from four to six ounces in weight, though there are some of two or three pounds. The surface is irregular, and sometimes beset with statish tubercles, and sometimes raised in ridges, on account of their being placed in distinct rows, which meet in various angles.

WATERS, EARTHS, FOSSILS and MINERALS. 277.

It is pretty hard, and when broken appears to be of a streaked texture, and the streaks run from the centre to the circumference. It is of a whitish green within, is covered with a brown crust, and is very bright and glittering when just broken. It strikes fire with steel, and burns to a purple powder. It is common in that have equipment in included

chalk-pits.

The Round PYRITES, with angular tubercles, is remarkably heavy, and is found from an ounce to a pound or upwards in weight. It is generally roundish, and the furface is remarkably rough. It is of a rufty colour, and is covered over with fhort quadrangular pyramids, which are broad at their basis, and blune at their points, commonly standing very upright and close to each other. It cannot be broken without a firong blow; but when it is in pieces, these are found to be streaked, and of a greenish colour, with some small mixture of yellow. It strikes fire with steel. and will flame foon in the fire, with the fmell of brimftone, and burfts to pieces; after which it calcines to a fine deep purple. It is common in England in the firata of chalk.

The Silver-coloured Round PYRITES, with a smooth furface, is of a pretty firm texture, and remarkably heavy. It is commonly round, and the usual fize is about an inch and a half in diameter; but it is fometimes met with to the weight of two pounds. It is always without tubercles and ridges, and the furface is of the same colour as the infide, though not quite fo bright. It breaks with a small blow, and when broken appears to be of a streaked texture, of a beautiful filvery green colour, and the streaks run from the centre to the circumference. It strikes fire with steel, and in the fire emits a blue slame, with a strong smell of brimstone, after which it bursts and calcines to a deep purple powder.

The PYRITES, with a foliaceous furface, is of a very firm though uneven texture, but very heavy; it is of various shapes, but commonly round. It is of different fizes, but generally large, though those of fix or eight inches are commonly round. It is harder than most other stones of this kind, and when broken ap-

278 The NATURAL HISTORY of

pears to be of a fireaked texture, and the extremities of the furface are feen in rows of thin leafy plates, which cover the whole. They generally lean one way, but are of unequal thicknesses, and sometimes norched at the end. The colour is a dufky green, which when broken is very bright and glittening. In the fire it emits a deep blue flame and burffs, after which it calcines to a purple powder. It is found at Coffeer in Saxony, and in Harre forest, and sometimes in England, particularly Mendis hills, Denbyshire, and

Connwall.

The PYRITES, with a fingoth gloffy furface, is of a very firm coarse regular substance, and remarkably heavy. It is of a very particular shape, being always more or less hollow, and in various forms, often like pebbles, but more particularly rugged and knobby. The common fize is five or fix inches in diameter, and the furface is so glossy, that even the tubercles thereon appear to be fo. It is very hard, and when broken appears to be streaked with irregular cavities, and the fireaks are more narrow than in other stones of this kind. On the inside they commonly terminate in broad plates, nearly of a square figure, and are disposed in rows. The general colour is greenish; but if it is broken where these plates are. it is commonly of a bright beautiful yellow. It emits a blue flame like the reft, and calcines to a

The Large Foliaceous PYRITES, in the shape of a cube, is of fo regular a figure, that it has by many been thought to have been the effect of art. It is of a firm regular firucture, very heavy, and is commonly found about one third of an inch in diameter. All fides are perfectly smooth, and it breaks in all directions; for it consists of plates in the direction of all the furface. It is gloffy on the infide when just broken, and feems to be composed of plates like talc. It is of a fine whitish green colour, with a small mixture of yellow. In the fire it emits a deep blue flame, with a strong smell of brimstone, and calcines to a deep purple. It is found in Germany, Hungary, and the East Indies. 51373

WATERS, EARTHS, FOSSILS, and MINERALS. 279

The Small Solid PYRITES, in the shape of a cube, is not unlike the former, it being firm and hard, and very heavy. The shape is regular, and the fize is commonly about an eighth of an inch in diameter. It is perfectly smooth on every side, and when broken is very bright and glossy. Its colour is commonly a pale yellowish green, though in those that are large it is somewhat of a rust colour. It cracks and bursts in the fire, emitting a deep blue slame, and at last calcines to a fine red. It is frequently to be met with in the northern parts of England, and many other countries. It is here found in common black slate, but

in Germany about the earth on the mountains.

The Bright PYRITES, with eight fides, is very firm and compact, of a pretty even texture, and very heavy. It is always composed of eight triangular planes, though it is subject to some varieties. Its most perfect shape is when two pyramids are placed evenly one against the other; but they are more commonly fer uneven and flanting, and their planes are very irnegular, with regard to their fize. It is from the bigness of a large pin-head to that of a walnut; they are naturally smooth, and of the colour of polished iron. When broken, the pieces appear very bright and sparkling, and often much paler than the outer furface. They feem to be composed of irregular thinundulated plates, laid more closely together than in the marchasites. In the fire it cracks and bursts, emitting a blue flame, with the fmell of brimflone, and at last calcines to a deep purple. It is found in Cornwall, and is very common in North America:

The Hard Shining PYRITES, with twelve fides, when perfect, is extremely beautiful, but is feldom met with in that state. It is pretty hard, of a regular texture, and very heavy. It is subject to great irregularities; but often wants one or more of its sides, and has commonly other bodies of its own substance sticking sast to it. It is of various sizes, it being from one inch to sour in diameter; but is more frequently about the third part of an inch. The surface is smooth and shining, and generally of a pale yellow, sometimes of the colour of rusty iron,

280 The NATURAL HISTORY of

and fometimes of polished steel. When broken it appears to be of a soliaceous substance, and to consist of very thin plates irregularly placed, and may often be distinguished by the naked eye. In the fire it emits a blue stame, with the smell of brimstone, and calcines to a blueish purple. It is found in Cornwall, but is more common in Germany, as well as in the East and West Indies. It is observable, that all these kinds of stones strike fire with steel, and will not ferment with aqua fortis.



CHAP. XXXV.

of FOSSILE PETRIFIED BODIES.

BEFORE we come to particulars, it will not be improper to take notice of petrifications in general, some of which are performed, as it were, within our sight, and therefore are most easy to be understood. The first of these is the stalactites, which is a kind of eylinder formed on the roofs of some caves and grottos, and which has been already taken notice of in its proper place. This is evidently brought to pass by means of the water, which carries with it very fine sand, that by length of time increases to different sizes, and forms the different layers which are successively produced one over another.

Another kind of petrification, which is well known, are the crusts of stone, which the water of some springs sixes by little and little to the pipe through which it passes; for these are almost every where to be seen. From these it plainly appears, that the matter of the petrifications, let their nature be what they will, is driven by water to the sides of the pipe in small particles, which being applied to each other without any regularity, forces the water itself to turn from the centre of its course, to make a passage for itself; because the stony matter is applied as it were by chance.

Another fort of petrification, also very well known, is that of the pieces of wood, shells, and other sub-flances, that are petrified in the bowels of the earth,

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Ophiomorphites 297





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WATERS, BARTHS, FOSSIES and MINERALS. 261

or in fprings, without losing their shape, or distinguishing marks by which they are commonly known. These may be distinguished into three kinds; thatmade in plates or layers, that done by pellets or balls,

and that by penetration.

The substances by which these are brought about, are water, salt, only juice, sand, mud, and clay. The water seldom penetrates the substance of stones to no purpose, but carries with it and mixes the materials of which it is composed; much in the same manner as the masons make use of water wherewith to blend and intimately unite the materials of which they make mortar or cement, that grows hard in proportion as the water slies off.

The three different petrifications are performed likewise by minute masses or lumps, and a very fine cement. The masses to be incorporated are the sand, clay, and loam: the most durable cements are the salts, and several kinds of bitumen. Sometimes the salts, intermingled with the clay, serve as a cement for the sand; at other times, the mass is composed of clay, or loam alone, without any intermixture. From the different degrees of these several bodies, thus differently intermixed, proceed a vast variety of productions.

To the first kind of petrisication we may refer talcs, slates, plumous alum, and plaster. As for crystal, it is nothing but a heap of sand, perhaps in a pyramidal or triangular shape, which the water applies successively one upon another, uniting them together with a little salt, and very sine mud; this is the more probable, because when crystal is decomposed in the fire, there remains nothing but calcined sand, earth, and a little salt. We need not wonder that crystal should be thus formed into a transparent mass, because several sorts of white sand, viewed through a microscope, appear to be nothing else but true white crystal. The earth or mud, that is joined thereto, only hinders them from shining like a diamond.

It is easy to imagine, that a fall of water may bring into any place a layer of sand and blackish earth, and that a second may throw another upon the former, and so on; insomuch that, in length of time, slate

182 The NATURAL HISTORY

may be produced of different thicknesses. In the same manner different substances may form tale, plumous

alum, and plaster.

The fecond fort of petrification is that, which is performed by small bullets or balls, and often by bunches composed thereof. It is probably by this means that gems receive their formation; because many of them are found in the chinks and cavities of certain rocks, where the water can bring nothing with it but fand, falts, and a little bitumen, and by chance fome metalline particles. These small congelations of matter, coming to fink and harden by degrees, may carry along with them the very fine particles they meet with. The generation of irregular flints, and all other stones that will strike fire with steel, seems to be the same as that of gems; for the water meeting in its course certain cavities more or less wide in marl, chalk or clay, that are in rocks, there deposits the falts, the oily fluids, and the fine fand with which it is imbuted. This water afterwards evaporating, the fand, and every thing that is introduced within the cavity, becomes hard as in a mold, and forms a male which takes the same figure. When fine sand is the principal ingredient, the concretion is more or less transparent and hard, as are all forts of gems. The colours are dull, variegated, or marbled with veins, in proportion to the different mixtures of the substance of which they are formed. When there is a great deal of falt or fulphur, which are well known to contain particles that strike the nose and yield fire, then the stone will have a strong smell of sulphur when it is broken or struck, and will sparkle when it meets the blows of another stone as hard as itself, or when it is struck with the steel or hammer, that by its extraordinary hardness discomposes the pores wherein the particles of fire are lodged. These forts of stones very evidently contain a great deal of fire, and therefore they might be supposed by some to be electrical, and yet it is plain they have no fuch quality, which may be owing to the earthy particles in which the fire lies hid, and which may prevent the effects of rubbing, in the same manner as a lock of wool.

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WATERS, EARTHS, FORSILS and MINERALS. 283

wool placed against a glass, or when tied to the string of a musical instrument, prevents the vibrations, and

confequently the found.

There are a great many flints and flinty flones that are exactly round or oval, or approaching thereto, and of all fizes, which feem to be composed of, or form small pellets or plates, by means of a nucleus which is the basis of the whole. When the water is loaded with a small bit of marl, or some small stone, as it repasses through this small mass, it will fill up its pores or inequalities with the clay or other particles contained therein, and will bestow upon it a smooth and pretty regular surface. If this is repeated feveral times by the application of the water to the mass, it will always leave a small layer or coat of sand before it flies off. These circular layers or coats growing hard, by the evaporation of the water, will form a small arch, which will grow still stronger and stronger. by the successive application of several other layers or coats. The whole will grow more thick in proportion to the number of times that the water returns, and deposites fresh matter. It may so happen that the nucleus of chalk, marl, stone, or clay, which has been as it were the foundation of the first arch, being rendered hot by some external means, all the moisture will evaporate and diminish the fize. By these means it may often come to pass, that there may be a nucleus in the middle of the stone, as we often find by experience; which may be fometimes, chalk, fometimes common earth, or other substances, quite different from that of the stone; so that at lengh by shaking the stone it may be easily found by the rattling. that some substance is contained therein. Thus the formation of round and oval stones becomes much the same as that of certain stones which are known by the name of Bezoars, and which are found in the bellies of feveral animals, both in the East and West Indies, and to which great virtues are attributed.

Some of these stones, that have a cavity in the middle, often contain a hard substance, or another stone, which may be easily known from the noise it makes when shaken; and this is commonly called by

284 The NATURAL HISTORY of W

the name of the Eagle Stone, to which most extraor-

dinary qualities have falfely been attributed.

The third manner of petrification is what is called by some penetration, and this is the most common; thus a large bed of fand, clay, or other matter, may be petrified by the falts and other particles wherewith the water is imbuted when it finks therein. The water will carry with it all the fine falts it has diffolved and taken up by the way, as well as the exceeding fine earthy particles which have remained therein. This water will readily pass, as well as every thing it contains, through a bed of fand, that is too full of pores to stop it; but it will fill by degrees all the interflices of more compact fand, and will closely unite all the particles; and by this means we may understand the formation of what we commonly call freestone. A bed of earth or of fand will be changed into a stone more or less hard in proportion to the quantity of clay or fand contained therein. Marl and potters clay thus mixed with fand will be changed into marble, whose ground may be either red, green, or black, according to the nature of the petrified bed. Perhaps the ground of any marble may be nothing but very fine fand, into which the water has penetrated, and carried at many thousand different times the fine particles of marl and potters clay, and which in process of time may obtain the hardness in which they are found; and confequently their natures, colours, mixtures, and clouds, may vary to infinity. If the potters clay has been dried and cracked by some subterraneous heat, the fine fand, or marl, or other substances which are carried by the water, and deposited in the chinks or cracks, may produce veins of all colours, and of all shapes. Likewise, when there are particles of gold, or any other metal, that are fine enough to be dragged along by the water, they may serve to augment the richness of these variegations. The drops of oily fluids, which the water carries along with it, may expand and form a multitude of small fpots, which may be round when they are at liberty, or oval when they are a little confined on each fide; or, in fhort, they may be angular, or of any other shape,

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shape, according to the impediments they meet with. All the winding veins, on the fides of which we fometimes fee rows of small specks of gold, or other metals, extremely fine, serve to shew very evidently the progress that the water has made; for when it happens to be stopped, and obliged to turn, it penetrates wherever it can, and fo produces very irregular variegations. The particles which the water contains. being naturally a little more heavy than itself, must needs be deposited in time, and stopping by the way. must penetrate the very first cracks or other cavities that they meet with. We may compare the formation of a marble, or other stone, to that of cloth or tapeftry; for the body of the fand or clay, which is capable of penetration by water, may be compared to that which weavers call the warp, and the water to the shuttle, which passes across the other without stopping. The fine fand, the particles of common clay, the colours of potters clay, the fine threads or small leaves of metallic substances, may all together be compared to the woof, which is introduced into the body of the work, and which fills it by little and little.

However, it fometimes happens, that there are thin plates or layers of clay between the different beds or firata of stone, and which are free from any mixture at all; from whence it appears, that they have hindered the progress of the water, for they only served to fustain, and could not be penetrated by it. Perhaps it may be thought a wonder, why there should be any stratum of stone or marble under this clay, fince the water could not get through it; but this will foon cease, when we consider, that many parts of the clay may be very thin and full of cracks, and confequently will admit the water to pass very freely through it. All the water with its contents may run over the clay. and may be shed, at the extremity of this layer, into the bed which lies beneath; and it has been found by experience, that many rocks of an enormous fize will not prevent the water from passing thro' their bowels. and falling into beds of fand that are placed under-

neath.

. That which the water performs, by the penetration of the different strata contained in the earth, it brings about in fome degree with regard to pieces of wood. bones, and other substances which it enters into and which affords us a reason or method of explanation of all the different petrifications, though never fo odd. which are to be met with in all parts of the world. We cannot determine whether there has ever been an universal earthquake or not, which has changed its primitive form; for we find feveral forts of animals. and fometimes mankind, in small islands at a vast distance from the main land, which can hardly be accounted for, but from some extraordinary cause, that has produced great irregularities in the face of the earth, making that to be a fea, which was dry land before, and raising up mountains out of the bosom of the deep; especially since we find, from some such change, that there are a vast number of marine bodies at a great distance from the sea, and a great deal higher than its surface. However, this is certain, that many fubfiances, which feem to have been proper only to the fea, are now found in the bowels of the earth; and which have perhaps been petrified by degrees, by the infinuation of water, falts, and exceeding small crystalline or stony particles, proper to fill up their pores, without alteration of their shape. To this all the productions which some have looked upon as lufus natura, or sports of nature, are evidently owing. Besides the bones of crocodiles, the skeletons of sea horses, the entire bodies of petrified fish, there are almost every where found fea shells of all kinds, and all forts of the parts of sea animals, converted into stone. Some are very wonderful with regard to their fituation, and others as to the oddness of their shapes. However, some are of opinion, that if these changes have been in reality produced by earthquakes, it will not from thence follow we should find them converted into stone; but this may be easily accounted for, if we reflect a little on what has just been said; for their fituation is no more difficult to be comprehended than that of flints, which are generated in the middle of other substances; for, though they undoubtedly

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WATERS, BARTHS, FOSSILS, and MINERAUS. 287

were in their natural state before the alterations were made, yet it is easy to conceive in what manner they have been petrified since that time. These petrifications have had different names bestowed upon them by naturalists, and therefore it will be necessary to give a more distinct account thereof. They are principally of two kinds, that is, animal and vegetable substances; some of which have remained in the earth a vast number of years without any great alteration, and others have been covered with or turned into stone; however, they all come under the denomination of Fossils.

With regard to trees, there have many been found buried under ground in many parts of the world, and particularly in England; as on the coast of Suffolk near Dulwich, in the sens of Lincolnshire and York-shire, and more particularly in the isse of Axholm, which is made by rivers, and lies between Notting-bamshire, Lincolnshire, and Yorkshire; as also on the coast of Pembrokeshire in Wales. These have not only been found near the sea, but in inland countries at

the depth of ten or twenty ells.

In England, there are some that lie at a distance from the fea, as in Chatmofs in Lancasbire, several parts of Yorksbire and Cheshire, as well as in Staffordfire. The places in this last county where they are found are Lagaton, and the old Pewit Pool in the parish of Norbury; Shebben Pool, in the parish of High Offer; the moffes near Eardley, in the parish of Andley, and near the town of Betley; all which lie in the high country of the moor lands. They are found fill farther from the fea in Cranmoor near Wrottefly; in Rotten Meadow under Wednesbury Hall; on Dorler Common in the parish of Gnofal; in a place called Peat-Moor, and in the moore of Handfworth; none of which are less than thirty, and some are above fifty miles from the fea. Some will have thefe to have been originally formed in the earth, especially because they refemble fire, of which fort none ever grew naturally in England, if we may believe the account that Cafar gives in his Commentaries; but his authority is not always sufficient. However, this appears plainly to

be a mistake; because many of these trees have their roots still remaining, as well as the stumps of their branches. If there is any fuch thing in reality as fossile wood, it is generally allowed not to swim on the forface of the water; whereas all these before mencloned will: besides, they still retain the qualities of wood, and fometimes they are found swimming in pools, which the country people get out, cleave into iplinters, and make use of them instead of candles. The chief difficulty lies in knowing whether firs ever grew in England or not; and fome, to folve this, have pretended that they have been brought hither by fome flood, particularly that of Neab, where they have lain ever fince. It must be acknowledged, that there is no impossibility in this, or at least that they may have been brought hither by fome fuch means; because they are full of a large quantity of bitumen, which no doubt would preferve them from corruption a vast number of years. However, this account is not very probable, because if they had been brought hither by a flood, they would have been found in all the low places alike, and in the fouth of England as well as in the north; for there are none in the vales of Evesbam and Aylesbury, nor indeed in many others, which feem to be most likely. Some of these trees appear as if they were burnt, and others have the marks of the ax still remaining upon them; besides, the flumps, from which they were cut, are in fome places also remaining, and appear in the same posture as when the tree was growing; particularly in Shebben Pool, when the fummer is dry and the waters low. Others, with more probability, have thought that these trees were not fir, but birch or alder; because they delight to grow in moift places, and having been foaked many years in a bituminous ftuff, have been fo well impregnated with an oily matter as to imitate fir both in fmell and burning: however, this can hardly be the case, because they split exactly like sir, and because they have evidently a turpentine smell; and befides, at Axbolm in Lincolnsbire, there have been found trees thirty-fix yards long, exclusive of the tops, which lay very near the roots to which they belonged. But

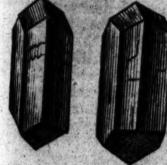
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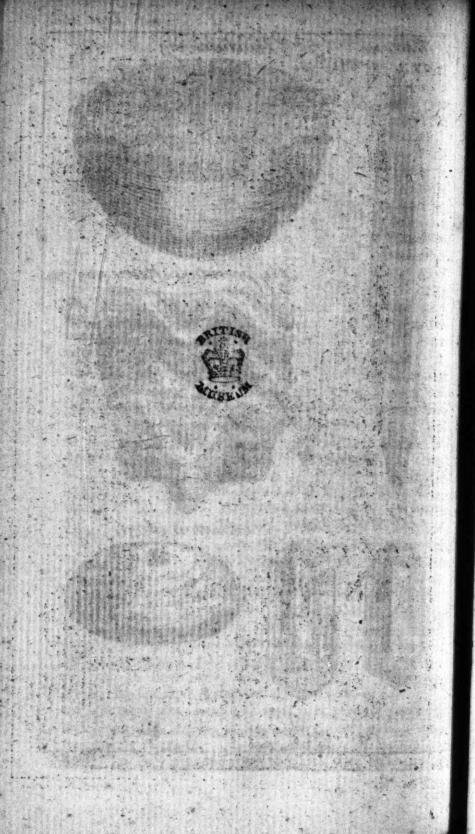
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WATERS, EARTHS, FOSSILS and MINERALS, 289

But it would detain the reader too long, and be foreign to our present purpose, to endeavour to account for the manner in which these trees have been brought Into this illand. Townsty a vacantage to common que w

Other trees, besides firs, have been found to have been buried under ground; for Dr. Moreson takes notice of a small maple-tree that he met with in a stratum of clay at a confiderable depth; and near Bath part of an elm-tree has been discovered of a confide. rable length: no doubt there have been many others, which have not been thought worth notice. But befides entire trees, or the principal parts, there have been commonly found in the fuel known in many parts of England by the name of Peat, and which is dug out of the earth, feveral fruits and catkins of other trees, that have been little altered in their texture. The most common of these are hazle-nuts; and near Whitlesea the twigs, as well as leaves, of white poplar have been feen, with the branches of hazle, and great numbers of the skeletons of leaves and catkins, befides the stones of plumbs or some such fruit. There have been some pretty large branches of trees found in the strata of stone, and commonly more or less changed into the nature of the strata in which they lay. A great variety of smaller branches have been found in the strata of blue clay, which ferves to make tiles in the neighbourhood of London; but though they were in their original shape, yet their internal structure was much altered; for they seemed to be changed into the substance of the common vitriolic pyrites. Thefe, and others of the like kind, are thought to have been branches of oak, and they are generally altered in some sense to the nature of the strata in which they lie, by the infinuation of crystal or stony particles; but in some the veins of the wood are still preserved, and appear very beautiful when polished. the Manner, when they be been been

Dr. Plott takes notice of stones which he calls STELECHITES, whereof one in his time was met with near Dudley, called by the country people the Pox Stone, that is, a stone which undergoes little alteration by fire. It was fo much like petrified wood, that he

1200 The NATURAL HISTORY of

took it for the stump of a tree at first fight. There are others of this name that are not fo worthy of it. particularly the Stelechites of Aldrovandus, that has the appearance of antimony; whereof many are found in the rocks near Beresford and Stanfop, and among the subble fromes that lie loofe above ground in the fields near Heatley and Bugots Bromley. They are a fort of annular stones, regularly jointed and regularly freaked at the top and bottom; and therefore as unlike the trunk of a tree, though some of them are branched, as any thing can well be; nor indeed do they refemble the trunk or frem of any plant whatever. Mr. Ray takes them to be the petrified back or tail bones of fifth, because they generally confist of feveral plates or pieces flicking together, like the vertebre of the back-bones of fome forts of fifth; though he acknowledges, that they are shorter and thinnen than the bones of any fish he had then feen.

Belides trees, and parts of trees, there have been different kinds of plants, which shave undergone the fame fate; and have either been wrapped in the black flaty stone found over the firsts of coals, or in loofe flones of a ferruginous substance. Some forts of flones contain the perfect images of plants, which feem to be nothing more than a painting, because the fluid contained in the plant has forintimately penetrated the fubitance of the stone, that it seems to be all of a piece with it, and has preferved nothing more chan the figure. The plants that are thus found are of different forts, but the most common are of the fern kind, yet not fuch as we have in England, for some pretend they are only to be met with in America. There are also a great number of fea mosses, with which many parts of the bottom of the fea are covered. An ear of barley has been found in one, or at deaft its image, very exactly painted. Some of the stones, when they have been split, have contained the figure only of the plant, while the other fide has appeared more prominent; which feems to have been occasioned by the petrifaction of the plant itself. Some of the ferns thus found have been different from any species higherto known; infomuch that it is hard 2001

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mation of the present globe of the earth.

Though these impressions have been most commonly found in the slaty stones above mentioned, yet there have been other stones met with in which they have been seen, though perhaps not so commonly; particularly, there is a whitish stone in Germany, not much harder than chalk, in which they have been frequently seen; as also a grey slate stone of a very sine texture, where they have been often sound, besides one of a blackish blue colour. Not only the entire branches of plants appear in these stones, but sometimes the leaves of trees; particularly those of the poplar, willow, white thorn, pear-trees, and many others.

Perhaps it will not be improper to take notice of others that are less singular, and which are common in Germany. These are the leaves of oak and other trees which hang over springs whose waters have a petrifying quality, by whose means they are often covered with a crust like the mosses in many parts of England. The stone that covers them seems chiefly to consist of a sort of spar. Many specimens of all these kinds are frequently to be met with in the cabinets of the

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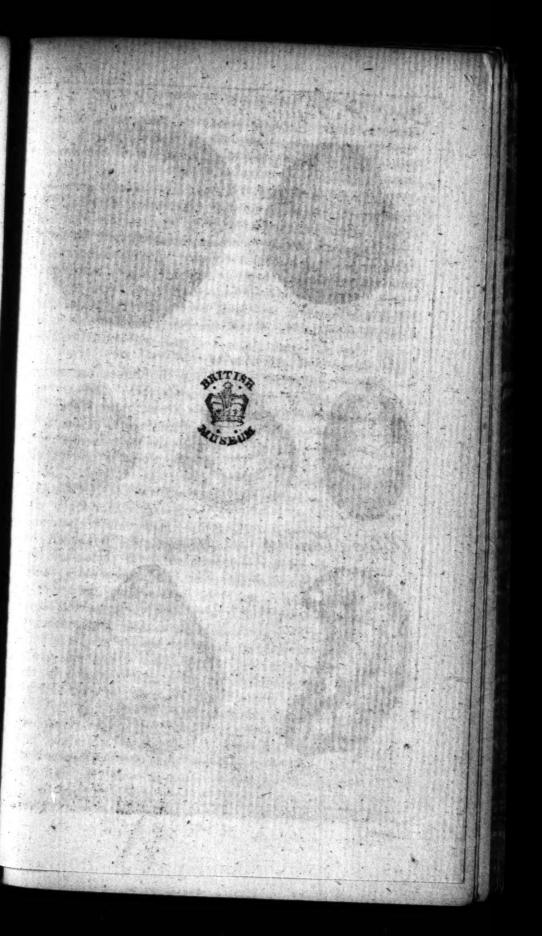
Dr. Plott has met with some forts of these petrifications in Oxfordshire, particularly at Samerton, where the grafs is covered with a foft stone, yet in such a manner that when it is broken off the grafs appears as fresh and green as before it was incrusted. Some of the blades of grass grow at least to a foot in length, and yet when pulled up with the root, and held up by that part, it might be pulled out as entire as a fword, out of the scalbard. At North Aston, in a field northwest of the church, there is another petrifying water, where the roots of rushes, grafs, and mois are in a thort time caten away, infomuch that nothing remains afterwards except the figures of those plants, with some augmentation. In the parish of St. Clement's in the suburbs of Oxford there is a ditch, the water whereof covers with a crust the sticks that fall out of a hedge. At Carfax, in the city itself, there is a pump, that not only covers the boards that fall into it 0 2 with

with a cruft, but also enters the very pores of the wood, which by degrees rotting away, there is nothing left at length but the lineaments of the wood itself.

Petrifications of this kind are always very brittle; though they leave a faint representation of the grain of the wood, yet they never preserve its colour; and in the fire they are as incombustible as stone; for they change nothing but their colour, which becomes more whitish: however, they will entirely dissolve in aqua fortis. There are some indeed that are petrified in a different manner, and will preserve both the colour and texture of the wood: they are sometimes so hard that they will cut glass, and will always strike fire with steel.

The petrifications of marine substances are more common than those of any other fort; and among them are found fish of various kinds, more especially shell-fish, or rather the shells of those fish. However, it is not very common to find any which represent the figures of river fish; though there is one called the Barbel Stone.

There are other fossils called OSTRACOMOR-. PHOS, which confift of heaps of oyster-shells cemented together. There are many other petrified shells that are not found in clusters, but each of them lie fingle in a separate state. Of these some are curiously streaked or furrowed, and others plain, with few or no ornaments. Of these again some are of a turbinated form, and others bivalvular, joined together by a hinge, yet the shells of these are commonly found apart. Among these are those called the Stromboites, from their wreathing like a screw, and generally from the right hand to the left, and from the greater to the smaller end. The largest exceed nine inches in length; but those in England, at least that have been hitherto found, are not much above five, with a plain furface; and the least are not above half an inch long, but curiously streaked. They are of an ash-colour, somewhat inclined to yellow, and of a harder confiltence than the stone in which they lie.



Sort of Scallop Streaked Cockle





Conchites







Oblong Concha

Swaked Conchites





Though a

There are some petrifications that resemble cockles, scollops, and oysters; and these are very numerous. The CONCHITES, or cockles, may be divided into the greater and the less; whereof some of the greater are streaked with broad streaks and pretty deep surrows, descending as it were from a centre at the top, and expanding themselves to the rim of the stone. They have also six or seven transverse simple lines, bent circularly to the hinge or joint: these appear to be a stone without, of a dark ash colour; but within they are found to be black slint. There are others again whose streaks descend from the hinge or joint, and yet not in straight lines, but undulated, and much broader than the former.

There are several kinds of the smaller Conchites, which differ in their colour, lines, and valves; for some are yellow, and are found in the sields near Burford in Oxfordbire: their valves rise high, and approach to a roundish shape. These made red hot, and put into beer, are accounted by the country people to be an immediate remedy for a stitch. In another part of this country, there are some of this sort that are flatter, and of an ash colour; but in both the lines run from the joint to the sim. These last are sound only at the head of a spring, but never at any distance from it. Some of these have been sound only streaked on one side, and rubble-stone on the other; and others have but just begun to be marked with lines.

There are others of this kind found in a bank of yellowish clay, and are of a different form from those just mentioned, for they are streaked transversely. Many of them appear to be hard stones, and yet several that have been met with were nothing but clay; which may justly raise a doubt, whether or not many of these, which have been generally supposed to be petrified shells, are properly so called.

There is another fort of Conchites found in Hornton quarry, nearly approaching to an oval, and scarcely streaked at all; which inclines Dr. Plott, as well as Dr. Lister, to think that these stones, which are so like cockles, never were in reality the shells of that sish.

There

There is still another fort of Conchites found in Hornton quarry, which is not stony on the inside like the former, but is hollow, and filled up with spar. It is sometimes in irregular sigures, but generally sorked. The base, or place where the branches of the fork are united, is at the joint or hinge of the valves; which

feems formewhat hard to account for.

There are also petrifications or stones, which refembles fcollop-shells, and are always found separate. One of these is very curious, and resembles the Rough Scollop of Aldrovandus. It is of a yellowish colour, and has ears on both fides, with lines that run from the hinge or joint to the rim of the shell. These are very prominent; and there are others that run transverfely, not bending towards, but from the hinge or joint, however, these do not pass through the deep furrows to as to join with each other, for they are only upon the ridges. There is another kind of scollop, where the direct and transverse lines are of an equal depth, but very fhallow, very numerous and fine. In these the transverse lines bend towards the joint. is of a light reddish colour, with ears on both fides, and is found in the quarries of Heddington in Oxfordbire.

There is another shell or stone like a small scollop, of a whitish yellow colour: the streaks are large and broad in proportion, but the transverse lines are small and narrow; however, it is eared, like the former, on both fides. These are called Pectunculi by Rondeletius, and he makes them a distinct species from the larger fort, which he names Pectines; but then those that he fpeaks of have never more than one ear, which is sometimes on the right, and sometimes on the left fide; but this has ears on both fides. There is another of the small kind entirely without ears, nor is there any fign of the ears being broken off; however, there are real shells of this kind taken notice of by different authors. There is fill another fort resembling a scollop, or, as some think, a fort of cockle, because it bears too much on one fide for the former. It cannot be a Tellenites, because if it has any streaks at all, they never run that way. These are in great plenty

in several parts of Oxford/birs; some of which are large, and as it were heaped one upon another; and others single, or found by themselves. The real shell-silve that answers to these are called Streaked Cockles; but they are always very smooth within, whereas some of these are evidently streaked on the inside; and the streaks not only run from the joint or hinge to the rim, but there are sour or sive broad transverse streaks, made up of several lines almost close to each other; for which reason some would have it to be a stone of a particular kind.

Besides the shells already mentioned, there are others that seem to be of the oyster kind, which are very common in the gravel pits in some parts of Oxfordshire; among these, there is one of an oblong shape, which is very thick, and of a blueish colour, and seems to be the same as the thick oblong concha taken notice of by Dr. Merrit, which he found in Worcestershire, where they are called Crow-stones, Crow-cups, and Eggs-

ftones:

There are other shells or stones that have some refemblance to muscles; but they are of an odd fort of a figure, and there are no real shells that we know of like them. They are not hollow, but are filled on the inside with a stony earth of a yellowish colour, and their covering is white and shining, with oblong lines. It is very long and narrow in proportion, and is marked, but very faintly, like the shell of a common muscle.

There are other petrifications resembling shell-sish, of the softer crustaceous kind, such as the Sea Urchin, which for substance and hardness are much like a pebble, and of a yellowish colour. They are divided at sirst by sive pretty straight lines, adorned on each side by a double row of points, ascending from a protuberant centre in the basis of the stone to another shape at the top, but soliated round in the manner of a rose. It is likewise subdivided by sive other indented lines, which terminate before they reach the centre; but they make the spaces between them appear like pentagons, or like the shells of some kinds of tortoises. Aldrevandus takes notice of a stone of this kind, which he imagined.

imagined resembled the Sea Hedge-hog deprived of its prickly coat. Dr. Plate calls it the Porcupine Stone without brissles. There is another that is curiously embroidered, and resembles the Sea Hedge-hog of Imperatus. It is of a whitish ash colour without, but within is a hard black flint covered over with thin glittering plates placed edgeways on the ball of the slint, and which compose the uniform eminences and depressures with waved and transverse lines. Some

Writers call these Serpents Eggs.

There is another fort of HEDGE-HOG STONE, which refembles the shell of a kind of sea hedge-hog, and is faid to be like the stellated eggs of that hedge-hog. Their outermost coat is full of sharp prickles, upon which account they are fometimes called Sea Chestnuts, because of their likeness to the rough prickles that encompais chefinuts while they are on the tree. When they are dead, all the prickles will fall off, and then the shell is discovered, which is curiously wrought. and refembles the stone of which we are now speaking. They confift of many compartments and eminences, which are fo regularly disposed, that the most ingenious embroiderer cannot eafily imitate them. It may be doubted, whether there is any animal with a shell like this frome; for no account has been given of any fuch hitherto. There is also another kind of Echinites or Hedge-hog Stone found in the quarries near Shotever Hill. The inward shell of this fish is very small, though the prickles are long and stiff; and it is always found in the deepest waters sticking to the rocks.

The Cornu Ammonis, or Ammon's Horn, is so called because it is like the horns of rams, which were confectated in the temple of Jupiter Ammon, seated in the fandy desarts of Lybia. They were formerly taken to be petrified serpents, and several authors have compared them to the nautilus, or have confounded them with each other. The unpetrified Ammon's Horns are divided by several partitions; but they have sewer sinussities than the nautilus, and they have no small pipes that run through them to preserve a communication one with another. There is also some difference in their covering; for the nautilus is very smooth, or at

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least the streaks of the surface only answer to the windings on the infide, and are very broad; whereas Ammon's Horns have several external turns, are covered often with tubercles, and almost always with streaks. There are plenty of the fossile kind in the county of Oxford, which are of different colours, shapes and fizes, but always fo curled up, that the place of the head is in the circumference, and the tail in the center of the stone. Some are small, with protuberant parts fwelling almost to a round; others are broader and more depressed; but the lines in both are undulated, and extended from near the centre to a fingleedged ridge on the back of the stone. In this respect they differ from a third fort that has broader lines, but not undulated, and they terminate at the large protuberances on each fide the stone, between which and the broad back thereof there run other lines; the whole body of the stone being likewise divided into futures, not much unlike the leaves of an oak.

A fort of these stones have been sound in the parish of Cleydon in Oxfordsbire, which have many more turns than the former, though they are not much bigger; but they are without a covering, and are of a yellowish colour, with streaks that run from the innermost part of the stone, and are all single, except that some of them are divided into two parts before they reach the rim of the stone, where they terminate with a back much more protuberant than the rest of the stone, though streaked in the same manner. There are also others met with that are not stones like the former, but consist of a sine stony earth, or hardened yellow clay; contrary to the opinion of some authors, who affirm that they are all of the same consistence.

The OPHIOMORPHITES nearly refemble the former, and are so called from their being like serpents rolled up. Some of these are also found so soft, that it is easy to break them with the singers; but there are others that consist of a hard blueish stone. They differ from these in their lines or surrows; for in the former the streaks are wider, and more open near the rim; but in some of these they are closer, and also united into pretty large protuberant knobs on each side the

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298 The NATURAL HISTORY of

back of the stone, which in these is broad and somewhat rising, and is crossed by other crooked or curve lines that run between the eminences. There are other stones of this kind, that have only straight single ribs, which likewise terminate in straight ridges, that run on each side the back of the stone; between which there is a third that is more prominent, and might be taken for the spine of the back; however, it is not wreathed, but plain like those on each side of it. The largest of this kind in Oxfordspire was found at Lang ford, near Oxford, and is eleven inches over, and weighs seventeen pounds. The ribs are single, and there are no knobs or ridges at the back, which is plain and even.

The BELEMNITES are so called from the Greek word Belemnon, which signifies a dart, because they are nearly of that shape. Authors are not agreed in what class to place this stone. The shape is, however, sometimes conical, sometimes cylindrical, and they most commonly consist of a substance that is black and horny; the length is from two inches to eight, and the diameter from the sixth part of an inch to three or sour inches in circumference. The inward parts consist of rays, and there is generally a cell at the large end, and a surrow that runs from the top to the bottom.

There are other stones that represent herbs and plants, among which are FUNGITES, or TUBE-ROIDES, so called from their resemblance to mush-rooms: these are of an ash-colour without, but a black sint within. Others resemble only the parts of plants, one of which has been met with like a root of briony broken off transversely, which shewed the small sibres that run from the centre to the circumference; as well as the other streaks that run down the sides, and the annular divisions. The colour also is so like that of briony, that it can hardly be distinguished from it, except by the weight. It was found in quarries of rubble-stone near Sbetover Hill in Oxfordsbire.

There are other stones like the fruit of trees, some of which are called PYRIFORMES, from their likeness to pears: one of these was sound of eleven inches in circumference, and in size and form resembling a king-pear. This was a black slint; but there is ano-

Briony Root Stone Jungites 296



Apriock Stone 299



Mulberry Stone





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tal oth the lik WATERS, EARTHS, FOSSILS and MINERALS. 299; ther that is whitish without, and yellow within, in the shape of a warden pear. Other stones have been found in the shape of apricots, with the cleft or surrow from the stalk to the top, exactly representing a real apricot; likewise there have been spars sound resembling mulberries, and white sints in the shape of Lacca olives.

There are also stones in the shape of those belonging to fruits. Most of these have a kind of pedicle or stalk, from which they seem to have had their growth, and are ridged and surrowed the whole length of the stone. Their texture is very curious, they being made up of little thin plates, not unlike the stone called the Selenite, only they are opaque, and the bulk of the stone much different. The plates seem to be made up of strings, some of which run two ways, and others three, and according to their directions the stone will readily cleave; yet they are all oblique to the axis of the stone.

There are other stones that resemble animals, either entirely or in part, among which there are some that seem to have been petrified reptiles, and very likely have been really such, which may easily be accounted for without the help of a stood. There are others that represent the shells of garden shails, and are very numerous. There are others called Worm-stones, which are of two sorts, and one of them is of a whitish yellow colour, but not hollow within; for they seem to be of the same texture with the pebble-stones among which they are found.

There are some stones that represent the parts of sour-stoted beasts; particularly in the quarries at. Heddington there are some that are like the head of a, horse, having the ears and crest of the mane, with the places of the eyes, as prominent as in a real horse; and the rest of the face entire, only the mouth and nose are wanting in them all. These are not uncommon, and they are of several sizes; though they are not taken notice of by any ancient authors. There are other stones in the form of hearts, and on account of their size are by authors called Bucardites, or stones like bulls hearts. They are of a whitish yellow co-lour.

500 TW NATURAL HISTORY OF

lour, with a smooth plain surface; though there are some that are ribbed on each side; these are ten inches in circumference, and weigh about two pounds; and there have been some sound that have weighed twice as much.

Dr. Phot met with some fort of stones in the quarries of the rubble-stone near Shotover, which were composed of filaments like hair; and which could not be the Polythrix of Pliny, because they are not greenish, nor the Bostrychites of Zoroaster, nor the Corsoides of Pliny, because they are neither grey nor long. However, it is a fort of Thrichites, because it is most like the short hair of beasts. The colour is yellowish, and each hair when viewed through a microscope appears to be streaked and surrowed throughout its whole length.

Some flones have been found accurately reprefenting the combs of bees, with the cells of each cavity all hexangular, exactly like those of honeycombe. There was one stone found in a marl-pit that was very like a mole both in the head and tail, but more especially in the foot; it was so very exact that it was divided into claws, and represented the foot of that animal in all particulars. Some have been found fo nearly refembling the head of an Owl, as almost to imitate life, having the eyes and beak of that animal very perfect. Another was of the shape and fize of a partridge's skull, with the eyes and short beak, and was hollowed behind just as if the brains had been taken out: to these may be added fill another, which was the accurate reprefentation of a pullet's heart, with the fat near the basis thereof, and the coronary veffels descending from it most exactly delineated. All these are taken notice of by Dr. Plott. Il all tada order are sport morning

There are some stones that seem to belong to the oviparous quadrupedes, among which is the Busonites of Toad-stone. Authors acquaint us there are two kinds of these, the first of which are those that are called Brontize and Ombria, which are sometimes of a dustry reddish, yellowish or greenish colour, of the fize of a hen's egg. From the slat or the concave side there generally runs sive lines to the centre of the con-

WATERS, EARTHS, FOSSILS, and MINERALS. 301

vex fide, at equal distances, and marked with exceed-

ing small tubercles.

There has been another stone found in the rubblequarry near Shotower Hill, that is a lively representation of olfactory nerves entire and whole: many of these are of a yellowish colour, smooth without, and hollow within. Dr. Plott found another of an oval shape, and chiefly of a reddish colour; but at one end it had a circle of white within, which is a zone of the colour of the stone, and then a round pupil of white, so that it looked like an eye darkened by a cataract.

There are other stones, which resemble the ears of a man, though much less, and Dr. Plots calls them Otites or Auriculares; they are common in the rubble-quarries near Shotower, but more so in a bank near a spring at Somerton town's end, eastward from the church. There are other stones met with in the shape of human breasts, having not only the nipple, but the areola studded with small protuberances, and therefore may be properly called Mammillares.

There are other stones, which exactly resemble the heart of a man, with the trunk of the descending part of the vena cava, as also the ascending part of the vein of the same name. Likewise from the lest ventricle there proceeded the trunk of the great artery, and a portion of the same artery tending downwards. Within it appeared to be a whitish sort of slint, and certainly deserves the name of Anthropocardites:

Other stones have been found exactly representing the private parts of a man; and others in the shape of kidneys, with the trunk of one of the preters descending from the hollow part of it. When found it was of the colour of a kidney, and was so soft that it might be readily cut with a knife, that is, the part of it resembling an ureter; but in less than an hour's time it grew as hard as the rest of the stone. To this class may be added the Triorchites, or Diorchites, which resemble the testicles of man or beast.

Some stones have been met with in the shape of human bones; particularly one exactly resembling the lowermost part of the thigh-bone of a man, with the

Charles

lower

lower head; between which are the anterior and the larger posterior sinus, which is the feat of the strong ligament that rifes out of the thigh, and that allows a passage to the vessels descending into the leg. A little above the finus, where the bone feems to have been broken off, there is a shining spar-like substance, resembling marrow in the hollow of the bone. Its circomference near the head is exactly two feet, and at the top above the finus about fifteen inches, and the weight is near twenty pounds; which shews that the Halk is too monfrous to have belonged to a man, though it is precisely of the same shape. With this there was found a tooth that weighed two owners and a quarter; but it was not at all petrified, which perhaps may be owing to the nature of teeth, whose hardness and want of large pores do not so readily. subject them to petrification: for the same reason in graves they are often found found and good, when all the other parts have been confumed. Not far from: Bath in Somerfetshire, there have been hatfuls of teeth. picked up by those who followed the plough, though no other bones were met with to which they might have been supposed to belong. We are informed by Tazellus in his history of Sicily, that two large skeletons were found, which, when they came to be touched, all fell into dust, except the teeth called the grinders. What: animal the thigh-bone above mentioned did belong to is hard to fay, though fome have taken it to be the bone of an elephant brought over by the Romans when they were masters of this kingdom. However, it does not appear from any authors, that those animals. were ever brought over into Britain; and yet it cannot he denied that several have been brought over hither for publick shews: but whether any died in Oxfordthire, and were there buried, must be lest to the judgment of the reader.

There has been a great number of montrous teethfound in different parts of England; and in Effex there were two met with in the reign of Richard I. which were large enough to make two hundred each of the common fize. One dug up near Maidstone in Kent wasnear feven inches in circumference, and weighed five ounces

WATERS, EARTHS, FOSSILS and MINERALS. 303

ounces and one eighth. In the year 1666, after the fire of London, when St. Mary Woolcburch was pulled down, there was a thigh-bone found larger than the above-mentioned; which however was not turned to flone. There was also another found in London three feet and two inches long. After all, we may be certain that these bones did not belong to elephants, because they are of a quite different shape, which has been found by comparing them together; and therefore Dr. Plott was of opinion they belonged to men or women. To support his opinion, he takes notice of the sizes of the several giants that have been mentioned by authors; and he likewise mentions a giant in France, who lived there about two hundred years ago: this man was said to be so tall, that a man of a common stature might go upright between his legs.

Dr. Plott likewise takes notice of a stone sound at the foot of Shotover Hill, which represents the leg and soot of a man cut off above the ancle, and which from the toe to the heel is about a yard long. However, he does not take this to be a petrification, but a stone formed in this shape by the plastic power of nature.

Besides these stones resembling the parts of animals, there are others not unlike things made by art. Among these are some of the shape of buttons, and others like the heel of an old shoe, with the lists plainly distinguished from each other. One of the button stones was found at Teynton in Oxfordsbire, pretty near resem-

bling a hair button.

Other stones have been seen like the bags called the Sleeves of Hippocrates, made use of by the chemists; and there have been three one above another, as they usually place them. Others have been found in the shape of a whetstone; and some in that of a cap. There is another stone of an ash colour called Trochites, from its likeness to a wheel; for it has rays or spokes which proceed from the center, like those of a cart-wheel from its nave. Some of these are called Entrochi, or Wheels within Wheels; the rays of one of the Trochites being in relievo, and always lying in the surrows between the two protuberances of the other, as in the sutures of a scull. The round part is smooth.

fmooth, and the nave is flat; from which, as in common wheels, the prominent rays proceed to the outward circumference, so as to leave furrows between them. They are joined together so curiously, that they seem to be the effect of art; for the spokes of one are inserted in the surrows of the other, so as to represent the sutures of a human scull. Sometimes there are twenty united together in this manner. When the Entroches is smooth in every part, the spokes are prominent. These stones differ in colour from each other; for some are white, others ash-coloured, and others again yellow: they differ also in size, for the largest are near an inch broad, and about a third as much thick. It is found in Saxony, in the cless of marble, of a whitish ash-colour.

The Entrochi of Staffordsbire are much larger, longer, and consequently compounded of more trochites, than those of Yorksbire or Somersetsbire; for some are three inches and a half in circumference, whose center or nave is half an inch over. One found in a rock was near fix inches long, but it was so fast inclosed that it could not be got out entire. Some of two inches and a half long consisted of thirty-five tro-

chites.

At Beresford, and other places in Staffordsbire, there are stones that seem to be made up of thick trochites, that have no bore at all, nor any rays at the top proceeding from a folid centre; which is no wonder, because when they are broken they do not feem to confift of plates like the reft. There is another fort that feem to be made up of joints like the Entrochi, in which the trochites neither appear round nor square on their outermost rims, but sharp like the edge of a screw, tapering from the place of their joining, and are streaked on their surfaces; so that the rays of one do not enter into the furrows of the other, nor yet do the rays join to the center at right angles; and this in these is a large cylinder of black flint. Neither are all these cylindrical as the former; for fome of them taper upwards from a broad basis, the lowermost rims being greatest, and decreasing gradually to the top. Some of these are so different from

WATERS, EARTHS, FOSSILS, and MINERALS. 305

the former, that they have a thin streaked plate passing from each rim to the sides of the cylindrical concavity; so that there appears a distinct concavity between each ring. Some again have others included within them, and appear like rings parallel to each other, and not like a screw, nor do the protuberant edges of the one enter into the furrows of the other, like the male and semale screws.

Some forts of these stones, that have such cavities, are in the form of five columns joined together without any addition; and others are bound by thin rings that stand pretty thick and at equal distances, which are not streaked. Some again are knit together by the fame fort of rings, that are only in pairs, there being fome distance between each pair; and others have four placed in the same manner. There is still another fort fenced in the same way, some of which are of an equal bigness from the bottom to the top, and are curiously wrought in small rings, first with two at fome distance, and then with four close together; and fo on alternately the whole length of the stone: but others, though like the former in other respects, are bigger both at the top and at the bottom, and refemble a pillar with a pedestal and capital. Lastly, there are some very small ones, that stand in cavities like firaight (mooth pillars, only they are marked with a row of knobs on each fide; and there are others that look like so many buttons piled upon each other.

ASTERIÆ, or STAR-STONES, are found in several parts of the kingdom, and particularly in the fields about Cleydon in Oxfordbire. They consist of thin plates lying obliquely to the horizontal position, much after the manner of the Jews Stone; and the colour is various, according to the different soils in which they are found: for this reason, in Gloucestersbire and Yorksbire, where they are taken out of a blue clay, they are nearly of the same colour, and break like shints with a dark shining surface. In Warwick-shire, as well as in some parts of Gloucestersbire, they are of an ash colour; and at Cleydon they are yellowish, because they are found in a yellowish earth. They are here about an inch and a half in length, and seldom less than an inch in circumference: and whereas

306 THE NATURAL HISTORY of

in other counties they are so hard, that it is difficult, is at all possible, to separate one from another without spoiling them; yet if these are steeped in vinegar for a night, they may be divided the next morning with safety and ease. They likewise differ from those of other places in shape; for, besides the sculpture that makes up the angles, there is the representation of a rose in the middle thereof, which is not commonly seen in those found elsewhere.

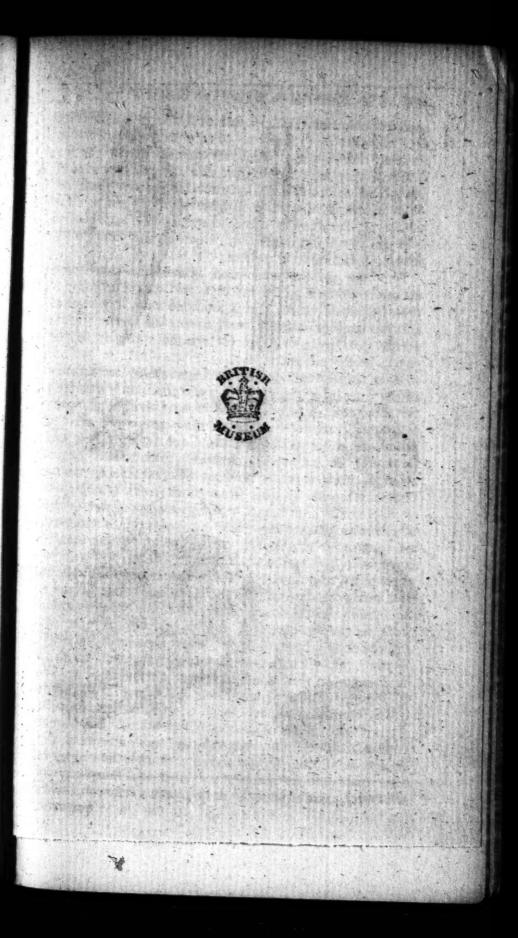
Many of the longest jointed Star-Stones have some of their joints a little broader and more prominent than others, dividing the whole body as it were into certain conjugations of two, three, or more joints, which, as Dr. Lister observes, are marked with sets of

wires, as he calls them.

The Star-Stones found in Staffordsbire are exactly of the fame shape, in which stars are commonly painted; for they have all five principal rays of an equal length, shape, and make, and proceeding from the centre, which is either folid or hollow, and where they join in angles of seventy-two degrees. They differ somewhat from each other in the different places where they are found, as also from those in Oxfordsbire, as well as from those taken notice of by Dr. Lifter in the Philosophical Transactions; for though they are placed on each other in columns, and feem to be fragments, fome having three, four, or more joints, yet none of them feem to be made up of plates lying obliquely to the horizontal polition of the flar; and fome of them have their angles fo very acute, and confequently their fides fo deeply furrowed, that they feem to represent the rowel of a four, without any sculpture or indented future; but when there is any fuch, they are of a quite different kind from those already mentioned.

The first fort are placed in a case of a slinty kind of stone, consisting of five angles; and the rays proceed from a solid centre of a coal-black colour, not bigger than a common pin; yet they are evidently of a stat sigure, consisting of sive angles; though the angles of the inner one do not point against the sharp rays of the outer, but against the deep surrows between them;

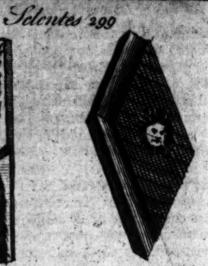
however,



Star Stone







Selenites 299





Star Stone

Cap Stone 303





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WATERS, EXETHS, POSSIES and MINERALS. 307

however, they are both smoothly jointed, without any

hatching of engraving.

The second fort consits of a flat and not hollow-fided piece, such as Dr. Lifer has described in the Philosophical Transactions; and the hatchings thereof are very different from all his. There is one principal ray which extends itself from the centre to the extremity of each angle, with oblique lines proceeding upwards therefrom, in such a manner that they in

some sense represent so many boughs of a tree.

The third kind has also stated significant the points are all unequal, one of them being always more protuberant than the next, and so alternately throughout the whole column. It consists of twelve joints, and the hollow of each angle is neither hatched on the top, nor is the column bent, or the least inclining, as those commonly are which are of a greater length. These have the property of moving in vinegar, like the former; and this property seems to have been known to Roger Bacon near sive hundred years ago; for in one of his epistles he affirms they would run in vinegar.

The ASTROITES are akin to the Asteriæ, and are of disserent sizes, but are adorned all over with many stars; and there are no less than four disserent kinds found in Oxfordbire, in two whereof the stars are in mezzo-relievo, they being prominent and standing outwards, with the streaks descending from the center at the top and all sides to the rock on which they grow. Some of these are of a larger and others of a smaller kind, which are both found in the quarries of rubble-stone. There is a third fort, which are more beautiful than the rest, and are deeply engraved like a seal; and streaked from the prominent edges above, to a centre in the bottom. These are generally hexagons, and sometimes pentagons; and yet they agree with the former in this, that the stars are only superficial, and not sound in the body of the stone:

The fourth fort has been imperfectly described by Gesner, and after him by several others. The streaks of these are like the third fort, descending in a concave; but from the edges are generally round, or with sive angles at the top, and tend to a center, but not

of their own kind, for they are smooth and apparently prominent. They are found in quarries of rubble-stone, and are stellated, not only on the surface of the stone, but quite through the depth thereof; yet not so as to have one continued star reach through the whole, but many, according to the thickness of the stone; for about ten of them lie in the depth of an inch, much after the same manner as the star-stones; only they are not separate, but join together, and make as it were so many rows of the stone. Some of these are so large in France, that they have been there used for the building of walls and houses; but with us they are generally employed in paving causeways, particularly in Oxfordsbire.

The property of moving in vinegar is common both to the Asteriæ and the Astroites; though the Asteriæ will move not only in a whole joint, but two or three connected together; whereas the Astroites must be broken into very small pieces before they will move. The Asteriæ has not only a progressive motion, but will turn round in vinegar, and will stir more briskly and longer than any other stone that vinegar has the like effect upon; and though it has been steeped therein for three or four days, yet when sresh is poured upon it, it will still emit a great many little bubbles as at first from underneath it, and at the instant it be-

gins to move.

Linnaus places the LAPIS JUDAICUS, or JEWS STONE, among petrifications; and Boet informs us that it is in the shape of an olive, and is roundish, tender, and brittle, with streaks that run according to the length, and placed at equal distances, as if they were done by art. The colour is whitish, or a faint ash colour, shining within, and it may be obliquely cloven into soliaceous plates. It is called a Jews Stone, because it has been found in Judæa, and other parts of Syria; but some of these have been found in England, particularly in Oxfordshire, which are of a more slender and longer shape than any fort of olive. Some are about two inches in length, and an inch and a half in circumference; but others have been met with less than an inch long, and not much

above half an inch round. Most of them have a kind of pedicle or stalk, from which they seem to have had their growth, and there are ridges or surrows through the whole length of the stone. The ridges are marked with small knots, in four points placed in a square, and a sifth in the middle. Their texture is very curious, for they consist of thin plates, as above, not

unlike the felenites, only they are opaque.

Linnaus likewise places CORAL, Madrepore, and the like, among petrifications; and he calls them Lithophytes, though they have been commonly placed among fea plants. Those of the Coral kind are a little flexible, like wood, when in the water, and to a small degree when out of it; but they may be reduced into powder like chalk. There are a great many of this kind, which resemble small trees without leaves: others are in the form of a net, sometimes with large melhes, and fometimes with small. The infide of the branches feems to be of the nature of horn; for it has the same smell when put into the fire; but the bark is of a stony nature, and contains a great deal of falt. Coral, properly fo called, is of a stony nature, and is placed in the animal kingdom, because it produces sea insects. Some of these are red, and others white, and others of various colours. However, the red, of the colour of vermillion, is best, and is by some said to be of the male kind, and that which is palish of the female. The white Coral is the next in value, and then black: but those of the other colours some will not allow to be Corals, though they are found in the same places. It is always covered with a bark, and is stony, folid, and very hard, even in the water; though the branches are a little flexible, but foon grow hard in the air. The bark of Coral is a mixture of tartar and a fluid of a gluey nature; and though it is a little rough, it takes a very fine polish. Some take the black Coral to be a fea plant of a different nature.

Red Coral is not so much esteemed in Europe as it is in Asia, and particularly in Arabia. It is used for making several sorts of toys, such as spoons, heads of canes, knife-handles, sword-hilts, and beads; and,

when fet in filver, it ferves as a play-thing for children, and is defigured to rub their gums therewith, that they may breed their teeth more easily.

On the young branches of Coral there are found

small eminences, pierced in the form of stars, and full of a milky fluid when they are just taken out of the water. Many learned men have thought fea plants to be nothing but petrifications, confisting of plates of falt, and layers of tartar, placed one upon another; and as coral always grows with its head downwards. in caverus of rocks in the fea, the fituation has caused them to suspect that they were nothing else but petrifications like those found on the roofs of certain caves in the rocks. But fince the discovery of the flowers of coral, and some other marine productions, it is not at all doubted but they have a regular organization; and if their feeds have not yet been perceived, it is because their smallness renders them imperceptible.

But some have thought that the generation of these plants is not owing to thefe feeds; because, as they always hang with their heads downwards, they would fall off to the bottoms of the caverns, and not place themselves on the top; but this difficulty may be re-moved, by supposing they are lighter than the sea water, and that the milk which furrounds them is of fo thick a nature, that it may help to affift them in swimming. Hence indeed it may happen, that many of them may rife to the top of the water, and there perish; but then likewise others may ascend to the top of the caverns, and there fix themselves, and then they will grow like the coral from which they proceed. Hence we may conclude, from the regularity of these productions, the organization of their parts, the great numbers of small pores in their bank to receive the bitumen and other fea juices, the eminences regularly hollowed in the form of stars, which serve for the cases of flowers in the same shape, the wessels full of a milky fluid which is found between the bark and the body of the plant, to make it grow thicker by little and little, and the perpetual uniformity of the fame circumstances; I fay, from all these particularities we have reason to believe, that the bottom of the sen is covered

covered with plants, with characteristics different from ours. In Spain they have a particular fort of a mamontory in Catalogia. This is a wooden cross which is very large, and in the center there is a wooden ball of a great weight, to which a very long and thick rone is fastened. At each end of the cross they hang a net in the form of a bag, which being let down into the fea, there are proper persons, who know where the Coral is to be found, and have the care of managing the rope. They guide one or more ends of the cross into the caverns, and then the nets lay hold of the Coral, break it off, and let it fall into the hollow part of the net; and when they have got as much as can well be contained in each of them, the machine is drawn up. The Red Coral is only chosen for medicinal uses, and many authors have ascribed great virtues thereto, which are in a great measure imaginary; however, it cannot be denied that it is a good absorbent, and therefore is proper to restrain the orgasm of the blood, and to blunt the acrimony of the bile and other humours in various forts of fluxes, as well as for the gripes in children. Its dose is from a scruple to a dram.

The MADREPORE has no bark like the former, but it is branched like it, though the branches are not so numerous. There are several sorts of them, and some are only a thick plate of a hardish stony matter, pierced with a great number of holes or pores, which are disposed in the form of small pipes, waves, stars, and other sigures; but it is most commonly in the shape of a small tree, and the branches are always full of holes or pores. It is found in various parts of the world, but no where in such great plenty as near the

Caribbee islands.

There are several sorts of them, as the stellated Madrepore akin to Coral; the branched Madrepore akin to Coral; the Madrepore or Millepore of Tournesort; the common Madrepore or sistulous white Coral; the Madrepore like southernwood; the warty-pointed Madrepore, by some called the water-pointed white Coral; and the white stellated Madrepore.

Though

112 The NATURAL HISTORY, &...

Though Madrepore is generally found growing in the sea, yet it is sometimes found on the tops of mountains: that met with by Justice on Mount Chaumont in Normandy was porous, light, white, and in all respects like the common Madrepore. It is, like most petrifications, alkaline and absorbent, and has much the same virtues as Coral. In sluxes of the belly, the dose is from half a scruple to two scruples.

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index.

THE PERSON

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INDEX.

Á

Cton-wells in Middlefex, 27 Agate described, 150 blood coloured, 161 - cloudy and flesh coloured, 161 - black veined and brown, 162 - greenish brown variegated, 163 - flesh coloured, 160 - lead coloured, ib. - dull milky, ib. pale yellow, 162 - red, 161 - white veined, 159 — yellow, 161 Alabaster, snow white shining, 197 - whitish yellow, ib, yellow and reddish variegated, 198 Alford water in Somersetshire, 38 Alum, native, 112 - factitious, ib. - roch or rock, ib. - manner of making in England, 112 - its medicinal virtues, 113 Amber, what, 120 - where found, ib. VOL. V.

Manager the rotate Amber, transparent, 121 - its medicinal virtues. Amber, black, ib. Ambergrease, what, 119 where found, ib. Amethift, a violet coloured gem, 151 where found, ib. Amianthus, reddish black, 84 - greyish green, ib. of Lapland, 82 Amianthus or mountain flax, 82 Amianthus of Linnæus, 83 Ammon's horn, a petrifaction, 296 Ancliff, a burning well in Lancashire, 25 Antimony, what, 123 Antimony, golden fulphur of, 124 - medicinal regulus of, 125 - its virtues, ib. - when a poison, ib. - crude, its medicinal virtues, ib. - its mechanical uses, ib. Armenian stone, 169 - fky coloured, ib.

World that, how beer

di codiames di rache de

1 N D E A	
Armenian flone, how pre-	
pared for painters, ib.	zinc, ib.
Arienick, extracted from	
cobaft, 117	eafily, ib.
what it contains, ib.	where found, ib.
a medicine from it, ib.	ib. It's medicinal use,
Afbeltos, 82	Bloodstone, a fort of iron
brown filky, ib.	ope, 475
grey filky, ib.	Bole Armenick, 67
grevish green filky.	yellow, 68
greyish green filky,	red, bo
- loofe thready, ib.	brittle white, 67
Afbeftos of Linnæus, .83	- white alcaline, 68
Afteria, a fort of opal,	of Blois, ib.
= 156 121 June 1	- bohemian, ib.
- by fome called a	brown heavy dense,
cat's eye, ib.	70 :01 :001
Afteriæ, or star stone, 3:5	greenish, ib.
Aftroites, or ftar stone,	French, 69 light brittle, 70
397 , busines 1 15	of Tokay, 68
moves if put in vine-	Borax, what, 114
Aftrop, chalybeate fpring	- mechanical and me-
in Northamptonshire,	dicinal uses, ib.
30	Brimstone, ib.
The state of the s	Briftol hot well water in
B	Somersetshire, 34
Astronous, while the	Brontiz, a petrifaction,
Bath hot fprings in Somer-	170 Par harmen.
fetshire, 34	Brosely burning well in
Barnet water in Hertford-	Shropshire, 41
fhire, 22	Broughton fulphureous wa-
Belemnites, a fort of pe-	Bucardites a patrifaction
Berill, a gem of a bluish	Bucardites, a petrifaction,
green, 155	Bufonites, a petrifaction,
different kinds, ib.	.300
- how counterfeited,	Burnly water in Lanca-
156	fhire, 25
Bismuth, a femi-metal	Buxton wells in Derby-
called tin-glass, 126	fhire, 19

C

Caergile, a mineral water o fin Flinthire, zoni Carbuncle described, 148 Carlton water in Lancathire 24 min Cats eye, a peculiar kind of gem, 152 - where found; 153 its value, ib. Cats eye or gem of the fun, 17011 , batto Cawthorp water in Lincolnshire, 26 Chadlington water in Oxfordflire, ga estat Chalcedony, 157 different kinds, ib. whatformerlyused for, vest (1.bus and Chalk, 56 no no. Chalk, marl bluifh, ib. --- red, 57 - black, 15 - filver of the ancients, Cheltenham water in Gloucestershire, 21 Chippenham water Wiltshire, 45 Chrysocolla, a fort of dull grit, 270 ++ found on the shores of New England, ib. Chryfolite, the Topaz of the ancients, 199 - gold coloured, ib. - the kinds, ib. - how counterfeited, ib. Cimolian Earth, 37

Cinnabar, its medicinal virtues, 128 - native, ib. contains quickfilver, ib. Clay, brown spotted, ca yellow, a forts, ib. Clays and Barths, 50 Clays described, ib. Clays, English, 3 forts, 52 bluish brittle fost, ib. foft pale red, 53 brittle black, 54 turf, green heavy, 52 Clifton water in Oxfordfhire, 31 Cobalt, what, 117 - contains bismuth. 112810 - leveral minerals fo called, ib. tinges glass blue, ib. Coal-kannel, its uses, 123 Coal-pit, fee Pit-coal Cobham, Chalybeate water in Surry, 43 Codfall water in Staffordthire, 39 Colurian Spring in Cornwall, 17 Comner water in Bedfordfhire, 16 Copper, 138 white, 139 ores, ib. - turned into reddiff ashes, 140 - how changed to brass, ib. --- how got from its ore, ib. 中国自己国际

to don man in the col

Copper pyrites, how	
known, 139	100
Copper springs, 140	Section .
its different ores,	\$423 8
141	Dia
Conchites, 293	MI I
Continues, 293	
Coral of Linnaus, 309	
- enquiries concern-	-
ing the nature of, 310	A-15-1
method of getting it	2. 10
in Catalonia, 311	mi
- Red, its medicinal	1000
uses in a great measure	
imaginable, ib.	f
Cornelian, a semi-trans-	-
parent ftone, 156	n
- of the colour of raw	Dia
	f
, flesh, ib.	5-5.5:395.
- different forts, ib.	
used for feals, 157	Do
Crickle spaw in Lanca-	W
fhire, 25	Dog
Croft mineral faring in	
Croft mineral spring in	
Yorkshire, 47	Dul
Crystal, what, 91	2
Crystal, bright, ib.	
blackish bright, ib.	31650
- dull whitish, ib.	
	P
brightish colourless,	Ear
92	1
- dull, ib.	-
brown, 93 crooked, ib.	
- crooked, ib.	-
yellowish bright, 92	
Call back of backs	
- fmall blackish bright,	
. 93	
white, ib.	-
with two pyramids,	
ib.	Frank.
il to long our	Fac
- with two long pyra-	Eag
mids, ib.	
Cryftals imperfect, 94	k
	100

D

amond, the hardest of ll gems, 144 - what fort best, ib. - remain unhurt in he fire, 146 - where most plenty, b.mod andw - value of, ib. - the largest when ound, 145 how nade, 144 mond, powder of, erves to polish gems, ddington fulphureous raters in Oxfordshire, 32 g and Duck water near London, 43 lwich water in Kent,

iban de **E** es Al

Earth, cimolean, 51, 55

— chian, 55

— celenufian, ib.

— cretan, 56

— fullers, 58

— fullers green, ib.

— of Malta, 51

— famian, 55

— melian, 56

— of Sinope, 65

— eretrian, 67

Eagle-ftone described, 171

— the different kinds, ib.

Echinites, a kind of petrification, 296 Emerald, green gem, 153 - different kinds, ib. - where found, ib. - the medicinal virtues, ib. - how counterfeited, 154 Emery, cuts glass like a Diamond, 175 Enhydrus, a-kin to the eagle-stone, 173 Enorchus, 171 Entrochi, or wheels within wheels, 303 Epsom wells in Surry, 41 Erafmus's well in Staffordfhire, 40 Euny well in Cornwall, 16

F

Fossile petrified bodies, 280 Fruits petrified, 298 Fungites, 298

G

Gainsborough spring in Lincolnshire, 27
Garnets, 149
their different forts, ib.
occidental, 150
large valuable,
149
mistaken by some for carbuncles, 150

Geodes, a fort of eagle fone, 171 Gold the heaviest of allmetals, 143 - extremely ductile, ib. fometimes found in a blue stone, lib. - native mixed with filver, ib. - how separated from filver, ib. - diffolves only in aqua regia, ib. mines of, where found, ib. Granite, hard white, 199 ---- exceeding hard red, - 200 - pale whirish, variegated with black, ib,. Grass petrified, 291 Grit, white stony, 262 - cream coloured frony. - coarfe bright white flony, 263 very coarse white flony, ib. - dull white fine flony, dull white coarse ftony, ib. - brownish white fine flony, 264 glittering greyish white, ib. - greenish white stony, - coarse greenish dull, 265 called the Puteolan powder, ib.

IXN ID DE NX.1

Grit, fine pale reddith, ib.	Gypfum, what Spring
- pale red faining, 266	hard white, libe
greyish red shining,	greyish white, 85
ib.	pale gloffy, ib.
very coarfe greenish	thining green, ib.
fired, rib. manasmol	fhining red and
fine thining iron co-	white, 84
loured, ib. with a	foft red, 8g
fine red flony, 267	foft white, ib.
coarfe and variegat-	
ed, ib.	and the second of the contract
gated, ib.	
brownish and varie-	Hanbridge water in Lan-
gated, 268	cashire, 25 (1)
fine flesh-coloured	Hampstead water in Mid-
variegated, ib.	dlefex, 28
- extremely pale whit-	Harrogate water in York-
ish red, ib,	fhire, 47
browish red coarse,	Hartlepool, . chalybeate
269	water in Durham, 10
very coarse blackish	Hedgehog, sea, a petri-
fiesh-coloured, ib.	faction, 296
very coarle reddish	Heigh a vitriolick water
green, 270 — fine shining pale	Heigh, a vitriolick water in Lancashire, 25
green, ib.	Hematites, a fort of iron
fhining gold-colour-	ore, 136, 175
ed, ib.	Hippocrates Sleeve, a pe-
- very hard fine black,	trifaction, 303
271 31111	Holy well in Cornwall, 16
fine black and white,	Holt, water, in Wiltshire,
ib. of the diament	46 75 Sidialosuu
very coarfe black and	Horfe-Head Stone, a kind
white, ib.	of petrifaction, 299
fining rufty black,	Hyacinth, a yellowish red
- coarse sparkling	gern, 150 different forts, ib.
brownish black, 272	where found, 151
fine brownish black	I onot vi astlatim
fparkling ib.	191 carbuncles, 150
pearage, ib.	
The state of the s	A STATE OF THE STA

ľ

Jasper, green, 164 - bright red, 166 - blueith green variegated with black, 165 - dull deep green, ib. - dusky green, 166 purple - dull and white, 167 - hard bluish green, hard dull flesh-coloured, 168 hard greyish green, - hard whitish green, - hard variegated purple, 166 - bluish marbled, 167 - pale bluish, 167 - pale brown hard, 167 foft dusky green, 164 - very hard yellowish green, 165 - yellowith hard variegated, 167 Jessop's well in Surry, 42 Jet, called by some black Amber, 121 Jews Stone of Linnæus, 308 Ilmington Water in Warwickshire, 44 Indian red, 64 Inglewhite chalybeateWater in Lancashire, 26 Iron, 136 - hardest of all Metals, ib. - how melted, ib.

Iron, ores of, ib.

its medicinal virtues,

138

Ifing-glafs bright brown,

73

bright purple, ib.

white finning, ib.

and of A K MINE

Kinalton mineral spring im Nottinghamshire, 31 King's Cliff Water in Northamptonshire, 30 King's Sutton Water in Northamptonshire ib. Kirkby-Thower a chalybeate Water in Westmoreland, 44 Knaresborough dr pping Well in Yorkshire, 49

L

Delications

Lachnis, pale gloffy fleshcoloured, 79
gloffy greenish white,
ib.
dull greyish white,
ib.
dull white, 80
dull flesh-coloured,
ib.
gloffy greenish, ib.
greenish white, 81
flesh-coloured gloffy,
80
white gloffy, 80

east him the season of the sea

Lapis lazuli, a Stone with golden fireaks, 169	Malton Spaw in York- fhire, 47
- ferves to make Ultra-	Magnet or Loadstone, 175
marine, ib. of two kinds, ib.	Marble, black and yellow,
Lead, 131	black with red and
Ore of, contains Sil-	white veins, 195
ver, ib. Marks how to find	white, and yellow veins,
it; 132	ib.
and Silver, 133	ash-coloured, 196 — blackNamure, 189
- its bad effects, ib.	black coralloide,
red, ib. white, ib.	192 black, 194
Lemington Water in War-	- bluish, black,
wickshire, 44 Lincomb Water in Somer-	hard, ib. brown and white,
fetshire, 39	brittle, 192
Litharge how made, 133	brown, 193 blue and white,
Livonian Earth, 68 Loams, their different	193
kinds, 59	Chian, 180
Llandridod Rock Water in Radnorshire, 32	low glosfy, 188
- Pump Water, 33	hard black, 189
ib.	of Derbyshire, 190 hard greyish black,
Loadstone, 175	191
Lydian Stone, a fort of black Marble, 189	red and white, 193
where found, ib.	- hard brown, 194
ib.	green, 191 green with white
	veins, 105
M	white spotted, 196
The gallie by the said and a second	greenish fost, ib.
Madern Well in Cornwall,	greyish brown,
Madrepore, 211	grevish green, 191

为他的

I N D B X

Marble, Numidian, 188	Mineral Waters with Salts,
pale brown, 193 pale grey, 197	ib.
pale grey, 197	- with Sal Gem, 14
parian, 187	abounding with
Lacedemonian, 190	Nitrum, ib.
purple and white,	Moreton Water in Shrop-
192	fhire, 41
red with white and	
gold veins, 197	1 10-11-11
Theban, ib.	N
white hard, 189 yellow and purple,	Manta william 16
	Naples yellow, 64
yellow and blue, ib.	Naptha what, 117 where found, ib.
Marchafites, filver colour-	what fort best, ib.
ed, 273	its medicinal uses,
gold coloured, 274	118
heavy white, ib.	Nephritick Stone, its ufe,
Marl, dense white spongy,	163
56	white, ib,
white alkaline, ib.	Nevil hot Water in Leicef-
chalk bluish, ib.	tershire, 26
- brittle bluish brown,	Newton Dale petrifying
57	Water in Yorkshire, 48
bluish stony, ib.	Nitre what, 109
- yellow brittle fandy,	how to obtain it, 110
ib.	- its uses in medicine,
- pale red brittle, ib.	ib.
- red heavy brittle, ib.	Nitrum of the Antients,
red fandy, ib.	109
red flony, ib.	Nocerian Earth, 68
red heavy, 58	Northall Water in Hert-
brown brittle, ib.	fordshire, 22
green fandy, ib.	Nottington Water in Dor-
Marls, 54	fetshire, 19
Matlock Bath in Derby-	Orlich Pluckel Water in
fhire, 18	o organized
Medicated mineral Wa-	Officeasores, a product
ters, 12	Okers, 62
Melian Earth, 71	- bright red brittle,
Mineral Waters with earthy	64
particles, 13	brittle black, 66

Oker, clayey yellow, 63	As and Proper short
ib. common yellow,	Paneras Wells in Middle-
crumbly yellow,	fex, 28
ib.	Pebbles crystal, 226
dufky yellow, 64	Pebble Stones, common,
gold coloured, 63	P.S. will as kind of as
heavy pale yellow,	Pectunculi, a kind of pe- trification, 294
light clayey, 64	Petrifactions in general
pale red, 65	how performed, 280
pale red clayey, ib.	like Ears, 301
green, 66	like the Nerves,
pale yellow, 62 faffron coloured,	301 like Hearts, 299
62 fairon coloured,	like Kidneys, 301
flony yellow, ib.	Bones, ib.
red heavy, 65	like Buttons, 303
purple, 64	like Legs, 3c3
Onyx, a Stone so called	of Teeth, 302
from a man's nail, 158 —— the different kinds,	Petrified Fish, 292 Cockles, 293
ib.	Gnoß, 291
Columns made there-	- Mulcle Shells, 295
with, ib.	Oyster Shells, 292
proper for Seals, 159	Plants, 290
Opal, a precious Stone,	Scollop Shells, 294 Shells, 292
the different kinds,	Trees, 287
ib.	Trees where found
Ophiomorphites, a petri-	in England, 287
faction, 297 W Harrow	Bodies, 280
Orpiment, 115	Petroleum, fee Naptha
its principles, 116	Pit Coal, 121 of what it con-
red, 115	fifts, 122
Orfton mineral Water in	Oil of ibelief
Northamptonshire, 31	Pit Coal Fires a preferva-
Offracomorphos, a petri-	tive against the plague,
faction, 292	ib. its medicinal vir-
Owl's Head Stone, 300	tues, ibversta de la sond
brantle black, 65	restrictes, 13

Pitchford Water in Shrop-	Pyrites, with a fronth
fhire, 41	gloffyrfurface, 278
Pitch mineral what, 118	Pyriformes, petrifactions
its medicinal ufes, ib.	like pears, 298 116 118
Pitch, Jews, 118	
Purphyry, purple, 198	
of the golour of	Salt, its geng medicine,
red Lead, 199	Contraction of the State of
pale red Ægyp-	Queens Camel Water in
tian, iba	Somerfetshire, 39
Portugal Earth, 69	Quickfilver, 129
Praffite, the Matrix of an	where found, ib.
Emerald, 154	which best, 131
the different kinds,	its medicinal vir-
ib	tues, ib.
Pumice Stone, 175	beaviest metal ex-
Pyrites, flat with a rough	cept Gold, ib.
Coathi 274 mol 33 moti	cept Gold, 16.
flat with a thick	
whitish brown coat, 275	Secretary Marches
bright with eight	
Sides, 279 255 200	Realgar what, 116
green without a	Road mineral Spring in
Crust, 276	Wilthire, 46
hard fining with	Rock Stone, 181
12 Sides, 279	Rougham Water in Lan-
like a bunch of	cashire, 24
grapes, ib. di	Rotten Stone, 72
large foliaceous	Ruby described, 148.dl
like a cube, 2278 1901	its kinds, ib.
-co my round with a	its value, iba
cracked coath 275001	balas, the matrix
-os well round ftreaked,	of the true Ruby, 1149
中國共產黨中國共產黨中國共產黨 医神经性萎缩 医阿克里克氏管 医克克氏管	Rubycell described, ib.
round angular,	
· 化碱基中面性核溶解,多种一面的现在分词是一个种的一致化化的多种。	Ruddle, 58 / 2141 -
277	counte flutting brown-
loured, ib di bonuol	S di di
mall folid like a	
cube, 279 di, ha	Sal ammoniac of the an-
with a foliaceous	
furface, 2772 manual	factitious, ib
idilace, 277-	ractitions, 305

Sal ammoniac, its uses in	Sand, palish brown yellow,
medicine, ib.	ib. 1. Smith
Salt, common, 107	- fine pale yellow, ib.
Salt foffile, or Sal gem, 107	fine gold-coloured,
Spirit of, its vir-	253
tues, 108	very coarse pale yel-
Salt, its uses in medicine,	low, ib. 5.11 10
100	- very dull whitish
Salt petre, rog Danson	yellow, ib.
- its uses in medi-	large shining yellow,
cine, 110	ib. co sime small
Sand, fine shining white,	- coarfe bright yellow,
246	ib.
- large shining white,	large dull yellow,
247	254
fine white very shi-	dull deep yellow, ib.
ning, ib.	very large dull faf-
- fine brownish white	fron-coloured, ib.
dull, ib.	coarfe dirty yellow,
yellowish white, 248	white areas a same disting
reddish white, ib.	coarse brownish yel-
- large brownish white,	low, 255 Qta- , 1918
nibaras sorian habis	greenish pale yellow,
- large yellowish white,	Court, 276di
249. 181 Simile 2008.	greenish red, pale,
large, coarfe, varie-	dull, ib. ca consider i
gated, ib.	coarle blackish yel-
dull brownish white,	low, ib.
ib. 8 at absolute ab vito 8	blackish straw-co-
- dull greenish white,	loured, 256
250 95167	blackish sulphur-co-
glittering greyish	loured, ib. as desirate
white, ib.	loured, ib.
large thining red, 251	
- large shining slesh- coloured, ib.	finest brown yellow,
coarse shining brown-	yellowish flesh-co-
ish, ib.	loured, ib.
fine brownish red, ib.	coarfe ftraw colour-
- pale brownish red, ib.	ed, ib. ort , seus
- very fine pale red,	- coarse sulphur co-
252	loured, 258
A designation of the second	The state of the s

The second of th	
Sand extremely shining	Sealed Earth, Tufcan, 60
yellow, 258	- Turky, ib.
yellow, with hetero-	Selenite, 86
geneous particles, ib.	- fine transparent, ib.
- large, of a yellow	Sea Urchin, a kind of pe-
gold colour, 259	trifaction, 295
very coarle faffron-	- opake ffreaked, ib.
coloured, ib.	- thin ftreaked, ib.
	— thick, 87
fine dulky faffron-	数:19.53 · 秦 · 尔· 中国公司第二十万世纪77年的高级国际,在1880年的报告,1982年的第二年的第二年的第三年的第三年的第三年的第二年的第二年的
coloured, ib.	fort, ib.
very fine brown dull,	transparent, ib.
260 0.000	thick dull, ib.
very coarle pale	- with longitudinal fi-
Stanger S wdie , nword	laments, ib.
- dull brown coarse, ib.	brown transparent, 88
- coarse shining pale	thin transparent, ib.
brown, 261	- dull thick, ib.
fhining greyishblack,	long fcaly, ib.
ib. of boiles	- with thin flakes, ib.
- thining reddish black,	dull, 89
ib. 1 608 housened	like a column, ib.
coarfe dufky green	like a column with
variegated, 262	thin fibres, ib.
Sand Stones, 177	transparent colour-
Saphire, a hard sky blue	lefs, ib.
'gem, 151	whitish dull, 90
where found, ib.	- with eight fides, ib.
how changed to a	with fibres like a ftar,
Diamond, ib.	
how counterfeited,	Selenite, a kind of petri-
Candanana a Chama barragan	faction, 299 Shadwell Water near Lon-
Sardonyx, a Stone between	don, 28
a Cornelian and an	
Onyx, 157 various kinds, ib.	Shapmore fulphureous Water in Westmore-
various kinds, ib.	water in weitmore-
best from the East	land, 45
Indies, ib.	Silver, 141
Scarborough Spaw, 49	its different Ores, ib.
Sealed Earth, of Striga,	mines of, where
69 61 411 14 11 16 16 16 16	found, 142
of Silefia, 68	- how feparated from
- red of Livonia, 69	Copper, ib.

N N D B X

Silver, how feparated from	Spar, dull, pale brown,
Gold, ab.	ib.
- cauftick made there-	white, brittle, ib.
. with, sib. the oall	light, pale brown,
Slate, Stone, 181 U me	WOLDE TO STATE
Slates their different kinds,	whicish brittle, ib.
opaku fineakcosi b.	hard pale brown,
Slate, Jriff, 189	ib. Al. Thereuton
Smiris or Emery, 175	whitish grey, 106
Smaragdoprastus, a fort of	whitish brown, ib.
geni, d54139 (1137)	hard, white, ob-
Spar, with a harrow ob-	long, ib.
-A long Pyramid, 100	Spelter, fee Zinc?
with a long Column,	Stanger Spring in Cum-
28.404md mant m. gatte	berland, 17
with a very fhort Co-	Star flone, a petrifaction,
lumb, ib.	3.05
with a broad Pyra-	Stelechites, petrifactions fo
di mid, ibu di di vi	called, 289
with a long Pyramid,	Stones, circumferibed
luce a column.db.	common, 200
flender, 102	Stones harder, common,
- with eight fides, ib.	216
with fix fides, ib.	- like flint, zzo
- with three fides, ib.	like pebbles, 231 crystalline, 226
with a very fhort	flinty, 224
Pyramid, rog with five fides, ib.	Strenfield Water in Lin-
commonly called Ire-	colnshire, 27
- land Crystal, ibon 1913	Stretham Water in Surry,
- milk-white opaque,	42
-anibasa tanW Hawbirds	Stromboits, a kind of pe-
- hard, grey transpa-	trifaction, 292
sacrent,giso4 gesetyve3	Sulphur, native, 114
transparent, colour-	- factitions, how
lefs, ib.	prepared, 115
- crufted, ib.	Sulphureous Waters, 14
brittle transpa-	Swansey Water in Gla-
storent, ib.	morganshire, 22
hard, whitish	Sydenham Wells in Kent,
brown, 105	23 1 10 0 10 10
	po annovid to hor

Ti Ti Co

diene alegacies viates

or E**m**otorance to both a legistal sum of Talc, 72 - Venetian, 73 - black shining, 74 bright green fhining. bright purple, 73 bright white, 78 - dull pale red, 76 -- dull white, 78 English, 77 - gold coloured fhining, 74 - greenish shining, 75 - green greyish, 75 - greyish yellow shining, 76 grey thining, 75 - gloffy yellowish, 77 - gloffy white greenish, 78 - fhining, 74 -- fhining bluish brown, with flesh coloured fibres, 78 -- orange coloured, 77 - fweet scented, 76 - of Linnæus, 73 Tilbury Water in Effex, Thetford spring in Norfolk, 29 Tin, 134 lightest of all metals, best mines of, in Cornwall, ib. - melts fooner than other metals, ib.

Tin, its medicinal virtues. Tin-glass, 126 Tincal, or green oker, 66 Toad-stone, 170 Topaz, the Chryfolite of the ancients, 155 Triochites, 301, 303 Tripoli, yellow, 71 greenish red, ib. pale brown, 72 fparkling brown, - sparkling red, ib. Tuberoides, a kind of petrifaction, 298 Tunbridge wells in Kent. Tunbridge wells near London, 29 Turky Stone, 168 Tuttenag, 126

Verditer, 53 - English, ib. Verdigrease, 141 - used by painters and dyers, ib. - its medicinal uses, ib. Vitriol, white, 110 blue, iti green, ib. how formed, ib.
white, its virtues, 112 - green, how made,

w side, of

Waters impregnated with metals, 14 West-Ashon spring in Wiltshire, 45 West-wood spring in Derbyshire, 19 Whaley water in Lancafhire, 25 Whitham water in Effex, Wigglesworth water in Yorkshire, 48

Station 33

Complete State V

Standa Line mot

ening the later with the

Impliant at a

Upminster water in Essex, | Willoughbridge water in Staffordshire, 40 Worm Stones, a kind of petrifaction, 299 to milion 12.

Zarnick, what, 116 Zinc, a femi-metal, 126 how gained from the ore, 127 -- very volatile, ib. ores of, ib.

flowers of, ib. --- flowers of, their virrues, ib.

Calcing the State of the State

Considerant toron wife The Water of Lines

FreM of Saint Maren's

Last, disconsider

ed other metal, and



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